BOILER CATALOG

The Houston, Stanwood and Gamble Co.

Manufacturers of

Engines & Boilers

CINCINNATI

The Houston, Stanwood & Gamble Co.

Makers of

Heavy Duty Throttling and Automatic Engines
High-Grade Stationary and Portable

Boilers

Boiler Catalog 1910

(All previous issues of Boiler descriptive matter are hereby superseded)

Works and Main Office at South End of
C. & O. R. R. Bridge in Covington

Cincinnati, Ohio, U. S. A.

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View in Central Bay of our Boiler Shop—Looking toward North End from Riveting Tower

Styles of Joints Used in H-S-G TRADE MARK Boilers

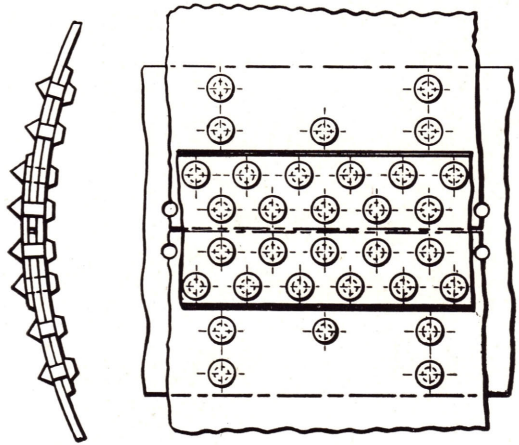


Fig. 5. Quadruple Riveted Butt Joint
Efficiency 94 per cent.

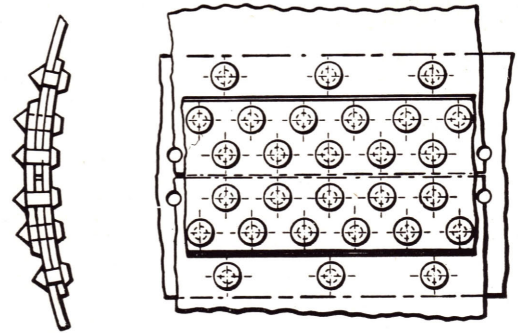


Fig. 4. Triple Riveted Butt Joint
Efficiency 86 per cent. to 88 per cent.

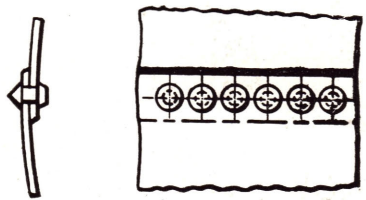


Fig. 1. Single Riveted Lap Joint
Efficiency 50 per cent. to 60 per cent.

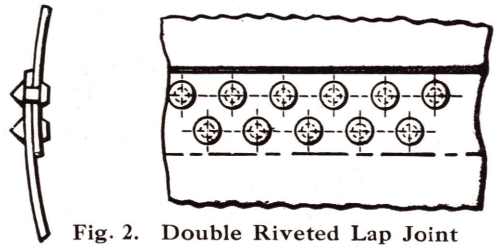


Fig. 2. Double Riveted Lap Joint
Efficiency 70 per cent. to 72 per cent.

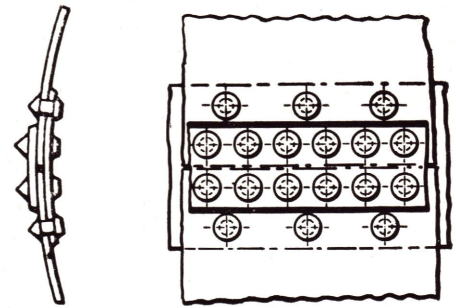
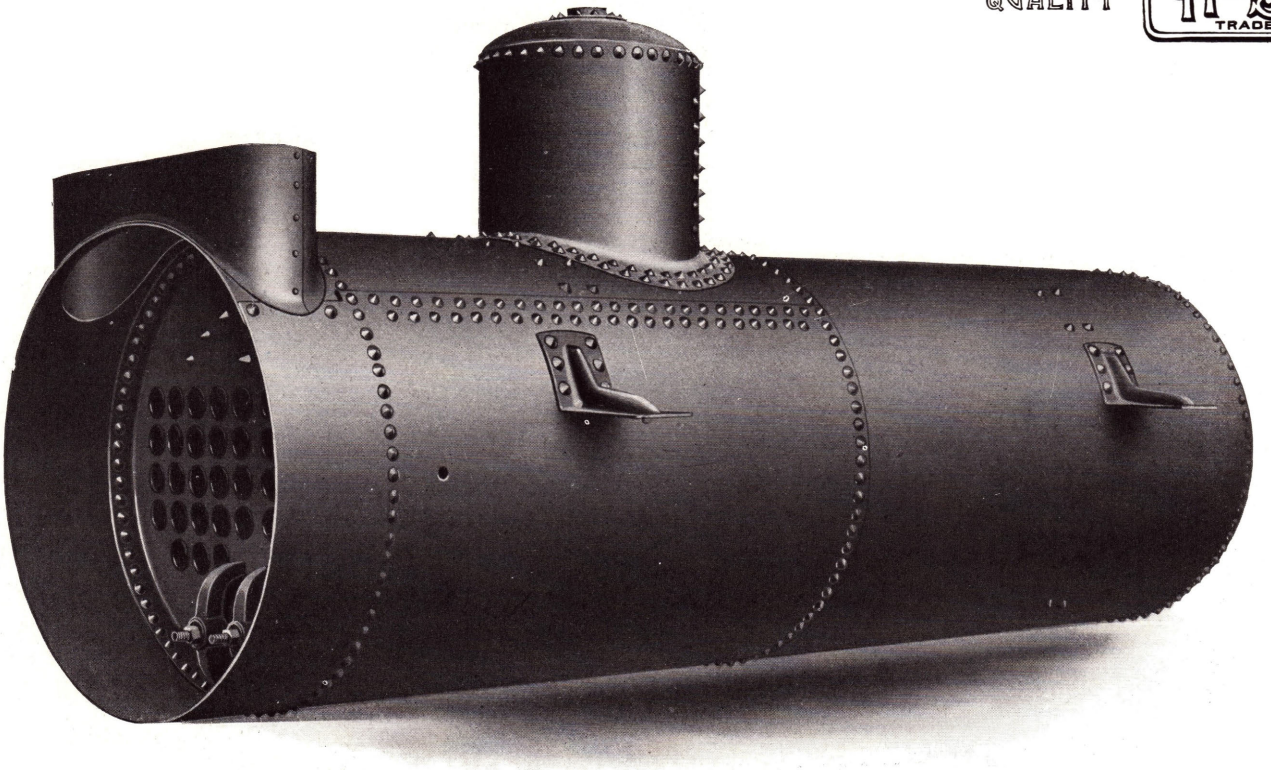


Fig. 3. Double Riveted Butt Joint
Efficiency 82 per cent. to 83 per cent.

The efficiency of a type of joint varies slightly because of differences between the various sizes of boilers, having same style of joint, in the relation of diameter and spacing of rivets to thickness of plate.

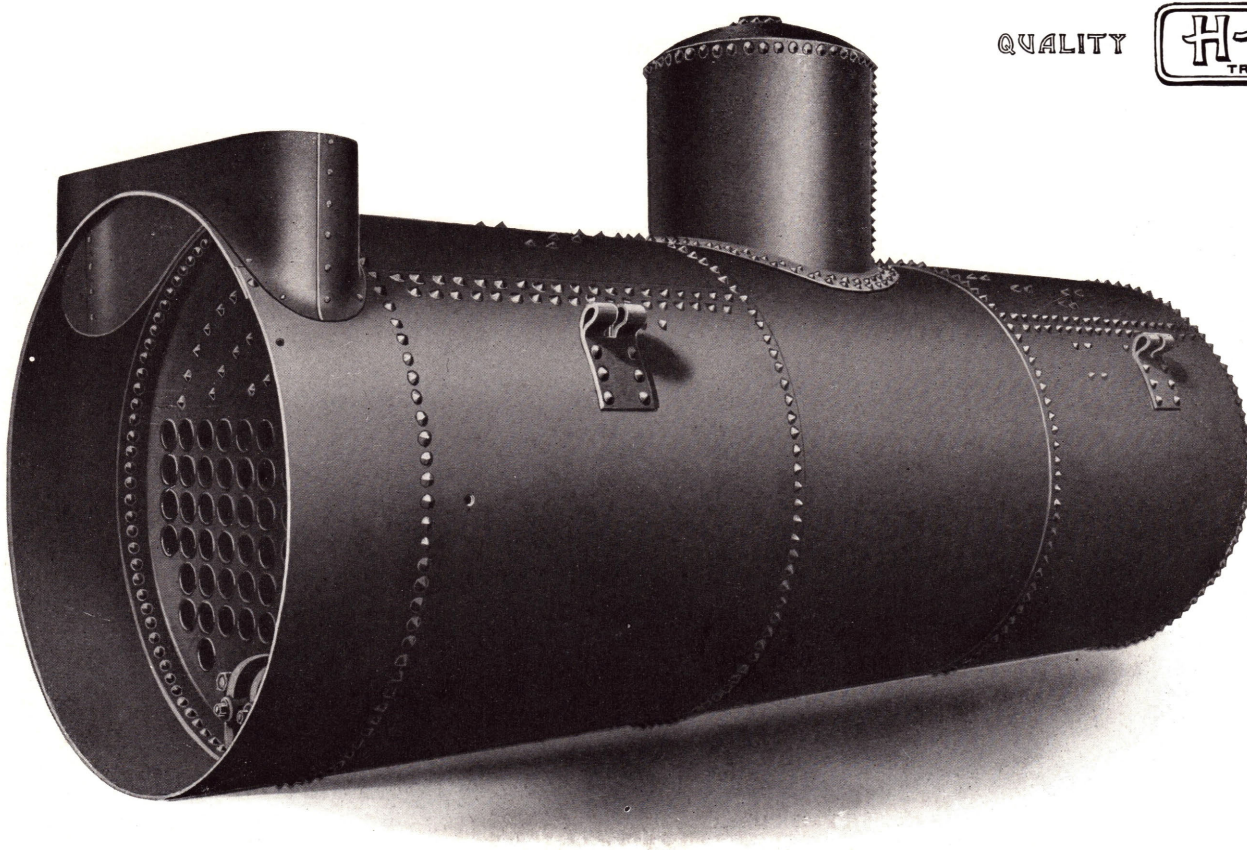
To find the thickness of shell plates, multiply the maximum steam pressure to be carried (the safe working pressure in pounds per square inch) by the required factor of safety (from 4 to 5) and multiply the product so obtained by one-half the diameter (in inches) of boiler. Then divide by 60,000, and divide the quotient by efficiency (expressed as a decimal fraction) of the style of joint to be used. The result will be the thickness of shell plates expressed as decimal fraction of an inch.



Double Riveted Lap Joints. Dome. 100 Lbs. Working Pressure

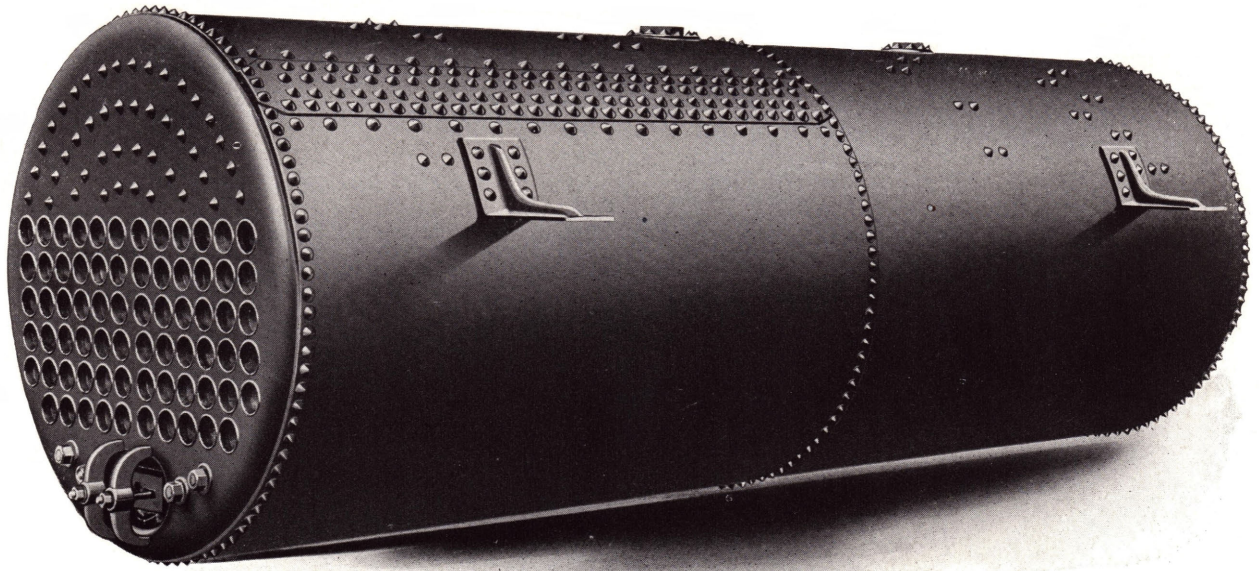
NOTE—Illustration shows Brackets; 54″ x 14′ and larger have four Brackets or four Loops. Sizes 48″ x 14′ and smaller always have Loops only, one at each end and on top.

QUALITY H-S-G TRADE MARK.



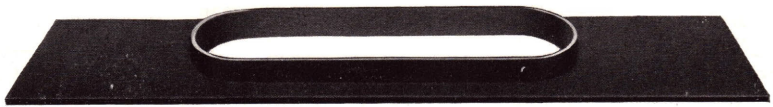
Double Riveted Lap Joints. Dome. 100 Lbs. Working Pressure

Illustration shows boiler with four Loops. See note on page 4 relative Brackets and Loops. These boilers in sizes 54″ x16′ to 66″ x 18′ inclusive are regularly built in three courses as shown in above illustration.



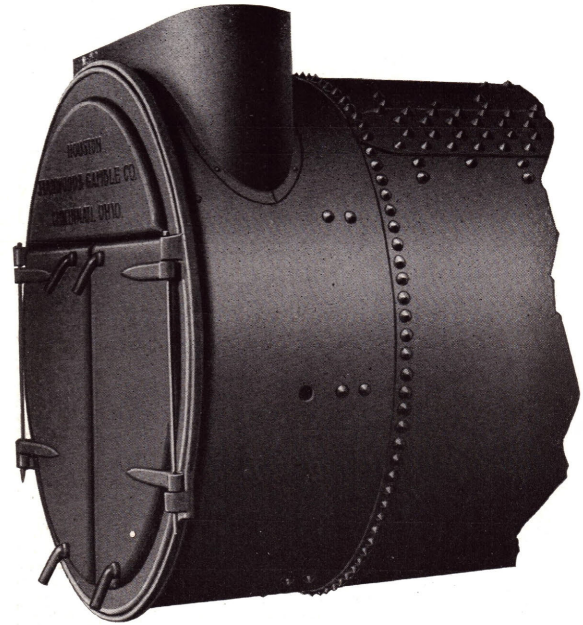
Butt Joints with Inside and Outside Covering Strips and Triple Riveted. For High Pressure

Four Brackets or four Loops are furnished. Illustration shows Brackets.



Stack Plate Casting

For Boiler with Full Front. No Steel Smoke Box is furnished with Flush-end Boiler for Full Front, but Stack Plate is used instead. Smoke Box is formed by the brickwork of the setting.



Steel Smoke Box with Cast Iron Flue Doors

For Boiler with Half Front or Three-Quarter Front. Smoke Box is bolted on to Flush-end Boiler. Thickness of plate in Smoke Box is $\frac{3}{8}$″ for boilers 66″ and larger, and $\frac{1}{4}$″ for smaller sizes.

H-S-G TRADE MARK Horizontal Tubular Boilers with Domes for 100 Lbs.

Longitudinal Seams Lap Jointed, Double Riveted

Horse Power		20	25	30	35	40	45	50	60	70	80	90	100	115	125	150	175	200	200
Diameter (Inches)		36	36	44	44	44	48	48	54	54	60	60	66	66	72	72	78	78	84
Length (Feet)		10	12	10	12	14	12	14	14	16	16	18	16	18	16	18	18	20	18
Thickness of Plate (Inches)	Shell, Mean Thickness	1/4	1/4	1/4	1/4	1/4	9/32	9/32	5/16	5/16	11/32	11/32	3/8	3/8	7/16	7/16	15/32	15/32	1/2
	Heads	3/8	3/8	3/8	3/8	3/8	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2	9/16	9/16	5/8
Tubes	Number	24	24	40	40	28	46	32	44	36	44	44	54	54	70	70	84	84	92
	Size (Inches)	3	3	3	3	3½	3	3½	3½	4	4	4	4	4	4	4	4	4	4
Dome Size (Inches)	Diameter	18	18	22	22	22	24	24	28	28	30	30	34	34	36	36	36	36	36
	Height	18	18	22	22	22	24	24	28	28	30	30	34	34	36	36	36	36	36
Size of Openings (Inches)	Steam Outlet	2	2	2½	2½	3	3	3	3½	3½	4	4	5	5	6	6	6	7	7
	Blow-Off	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2½	2½	2½
	Side of Dome	1	1	1	1	1	1	1	1	1	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½
	Water Column	1	1	1	1	1	1	1	1	1	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼
Size of Fittings (Inches)	Pop Safety Valve	1½	1½	1½	2	2	2	2½	2½	2½	3	3	3½	3½	4	4	2-3	2-3½	2-3½
	Blow-Off Cock	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2½	2½	2½
	Check and Stop Valves	¾	¾	¾	1	1	1¼	1¼	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	2	2
Grate Area	Width (Inches)	36	36	42	48	42	48	48	54	54	60	60	66	66	66	72	78	78	84
	Length (Inches)	36	36	36	36	48	48	48	48	54	54	60	60	60	72	72	72	72	72
Stack (for One Boiler)	Diameter (Inches)	16	16	18	18	18	24	24	26	26	28	28	32	32	36	36	38	38	42
	Length, Ft., Minimum	30	35	35	35	40	40	40	40	45	45	50	45	50	50	50	60	70	60
	Gauge Steel (Number)	16	16	16	16	16	16	16	16	16	14	14	14	14	12-14	12-14	12-14	12-14	12-14
Weights (Lbs.) Estimated	Boiler Bare	2900	3400	4150	4800	5200	5900	6500	8500	9400	11600	12400	14100	15600	17900	19200	22600	25000	26500
	Castings (with Half Front), Fittings and Stack	1650	1700	2150	2200	2600	2800	2800	3300	3600	4000	4200	4800	5000	5700	5800	7400	7800	8100
	Boiler Complete	4550	5100	6300	7000	7800	8700	9300	11800	13000	15600	16600	18900	20600	23600	25000	30000	32800	34600

Boiler complete includes: Bare boiler (with heavy cast iron flue doors except when full front is to be used); Castings consisting of half front (unless three-quarter front or full front is specified) with fire doors, ash doors and anchor rods, wall liners for fire door openings, tupper grate bars (perforated grates or common grates when ordered instead of tupper grates will be furnished without change of price) with bearers, soot door and frame, and back arch bars (back wall plate is furnished for boilers 48 inches diameter and smaller); Fittings consisting of combination water column with water gauge glass and valves, three ball gauge cocks, steam gauge with syphon and cock, pop safety valve, regrinding globe valve (for boiler feed), regrinding check valve, and blow-off cock; and Smoke Stack with guys. Buck bars and rods, wall plates and rollers, whistles, or other additional items are extras and will only be included when specially ordered and at an extra charge.

H-S-G TRADE MARK Horizontal Tubular Boilers. No Domes. For 125 Lbs.

Longitudinal Seams Butt Jointed and Double Strapped; Triple Riveted in Sizes 60-inch Diameter and Larger and Double Riveted in Smaller Sizes

Horse Power		45	50	60	70	80	90	100	115	125	150	175	200	200
Diameter (Inches)		48	48	54	54	60	60	66	66	72	72	78	78	84
Length (Feet)		12	14	14	16	16	18	16	18	16	18	18	20	18
Thickness of Plate (Inches)	Shell—Minimum Thickness at Edges	5/16	5/16	11/32	11/32	3/8	3/8	13/32	13/32	7/16	7/16	15/32	15/32	1/2
	Heads	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2	9/16	9/16	5/8
Tubes	Number	46	32	44	36	44	44	54	54	70	70	84	84	92
	(Size Inches)	3	3½	3½	4	4	4	4	4	4	4	4	4	4
Size of Openings (Inches)	Main Steam Outlet	3	3	3½	3½	4	4	5	5	5	6	6	7	7
	Safety Valve Outlet	2	2½	2½	2½	3	3	3½	3½	4	4	4	4	4
	Internal Feed Pipe	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	2	2
	Blow-off	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	Water Column Openings	1	1	1	1	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼
Size of Fittings (Inches)	Pop Safety Valve	2	2½	2½	2½	3	3	3½	3½	4	4	2–3	2–3½	2–3½
	Blow-off Valve	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	Check Valve and Stop Valve	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	2	2
Grate Area	Width (Inches)	48	48	54	54	60	60	66	66	66	72	78	78	84
	Length (Inches)	48	48	48	54	54	60	60	60	72	72	72	72	72
Stack (for One Boiler)	Diameter (Inches)	24	24	26	26	28	28	32	32	36	36	38	38	42
	Length (Ft.)—Minimum	40	40	40	45	45	50	45	50	50	50	60	70	60
	Gauge Steel (Number)	16	16	16	16	14	14	14	14	12–14	12–14	12–14	12–14	12–14
Weights (Lbs.) Estimated	Boiler Bare	6200	6700	8300	9800	12100	13300	14600	15900	17900	19400	22600	25000	26900
	Castings (with Half Front), Fittings and Stack	2800	2800	3300	3600	4000	4200	4800	5000	5700	5800	7400	7800	8100
	Boiler Complete	9000	9500	11600	13400	16100	17500	19400	20900	23600	25200	30000	32800	35000

Boiler complete includes: Bare boiler (with heavy cast iron flue doors and smoke box, except when full front is to be used); Castings consisting of half front (unless three-quarter front or full front is specified) with fire doors, ash doors and anchor rods, wall liners for fire door openings, tupper grate bars (perforated grates or common grates, when ordered instead of tupper grates, will be furnished without change of price) with bearers, soot door and frame, and back arch bars (back wall plate is furnished for 48-inch diameter boilers); Fittings consisting of combination water column with water gauge glass and valves, three regrinding compression gauge cocks, steam gauge with syphon and cock, pop safety valve, extra heavy globe valve (for boiler feed), extra heavy check valve, and extra heavy renewable seat and disc blow-off valve; and Smoke Stack with guys. Buck bars and rods, wall plates and rollers, whistles or other additional items are extras and will only be included when specially ordered and at an extra charge.

Internal feed pipe is furnished in all boilers for 125 pounds (except when boilers are built to specifications omitting internal feed pipe).

Boilers may be furnished either with brackets or with plate hangers (or loops).

H-S-G TRADE MARK Horizontal Tubular Boilers. No Domes. For 150 Lbs.

Longitudinal Seams Butt Jointed, Double Strapped and Triple Riveted

Horse Power		45	50	60	70	80	90	100	115	125	150	175	200	200
Diameter (Inches)		48	48	54	54	60	60	66	66	72	72	78	78	84
Length (Feet)		12	14	14	16	16	18	16	18	16	18	18	20	18
Thickness of Plate (Inches)	Shell—Minimum Thickness at Edges	11/32	11/32	3/8	3/8	13/32	13/32	7/16	7/16	1/2	1/2	17/32	17/32	9/16
	Heads	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2	9/16	9/16	5/8
Tubes	Number	46	32	44	30	44	44	54	54	70	70	84	84	92
	Sizes (Inches)	3	3½	3½	4	4	4	4	4	4	4	4	4	4
Size of Openings (Inches)	Main Steam Outlet	3	3	3½	3½	4	4	5	5	5	6	6	7	7
	Safety Valve Outlet	2	2½	2½	2½	3	3	3½	3½	4	4	4	4	4
	Internal Feed Pipe	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	2	2
	Blow-Off	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	Water Column Openings	1	1	1	1	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼
Size of Fittings (Inches)	Pop Safety Valve	2	2½	2½	2½	3	3	3½	3½	4	4	2-3	2-3½	2-3½
	Blow-Off Valve	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	Check Valve and Stop Valve	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	2	2
Grate Area	Width (Inches)	48	48	54	54	60	60	66	66	66	72	78	78	84
	Length (Inches)	48	48	48	54	54	60	60	60	72	72	72	72	72
Stack (for One Boiler)	Diameter (Inches)	24	24	26	26	28	28	32	32	36	36	38	38	42
	Length (Ft.) Mimimum	40	40	40	45	45	50	45	50	50	50	60	70	60
	Gauge Steel (Number)	16	16	16	16	14	14	14	14	12-14	12-14	12-14	12-14	12-14
Weights (Lbs.) Estimated	Boiler Bare	6600	7200	9000	10300	12700	14100	15100	16700	19100	20500	24500	26700	28100
	Castings (with Half Front), Fittings and Stack	2800	2800	3300	3600	4000	4200	4800	5000	5700	5800	7400	7800	8100
	Boiler Complete	9400	10000	12300	13900	16700	18300	19900	21700	24800	26300	31900	34500	36200

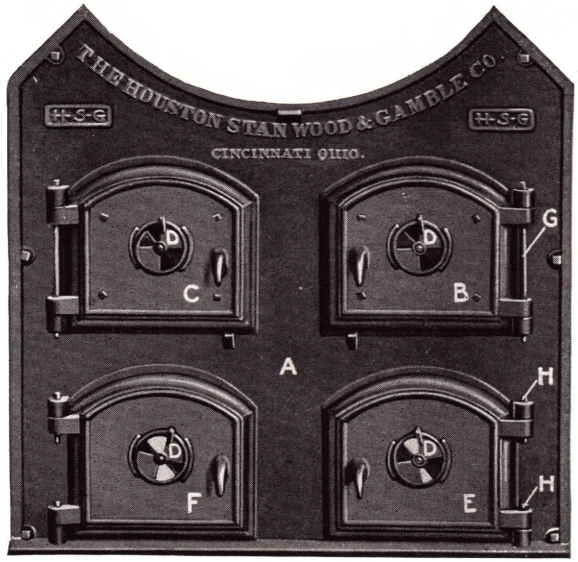
Boiler complete includes: Bare boiler (with heavy cast iron flue doors and smoke box except when full front is to be used); Castings consisting of half front (unless three-quarter front or full front is specified) with fire doors, ash doors and anchor rods, wall liners for fire door openings, tupper grate bars (perforated grates or common grates, when ordered instead of tupper grates, will be furnished without change of price) with bearers, soot door and frame, and back arch bars (back wall plate is furnished for 48-inch diameter boilers); Fittings consisting of combination water column with water gauge glass and valves, three regrinding compression gauge cocks, steam gauge with syphon and cock, pop safety valve, extra heavy globe valve (for boiler feed), extra heavy check valve, and extra heavy renewable seat and disc blow-off valve; and Smoke Stack with guys. Buck bars and rods, wall plates and rollers, whistles, or other additional items are extras and will only be included when specially ordered and at an extra charge.

Internal feed pipe is furnished in all boilers for 150 pounds (except when boilers are built to specifications omitting internal feed pipe).

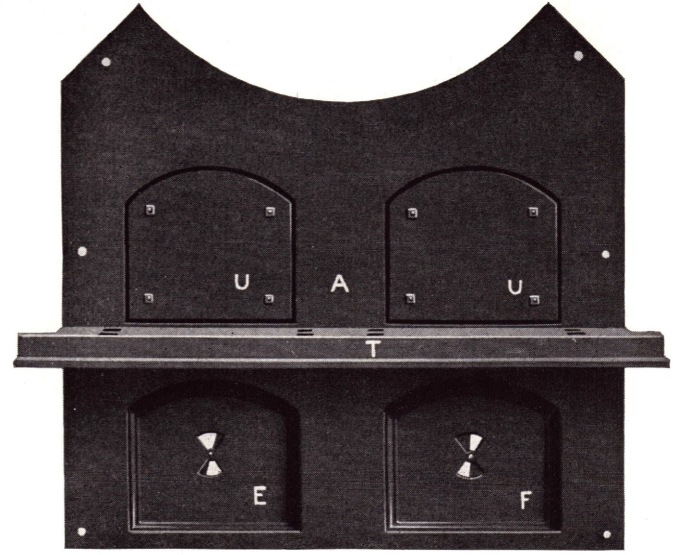
Boiler may be furnished either with brackets or with plate hangers (or loops).

Half Front

QUALITY H-S-G TRADE MARK.



Front View



Rear View

If slabs or other bulky fuel is to be used, one large opening with double doors instead of two separate fire door openings can be furnished, if specially ordered.

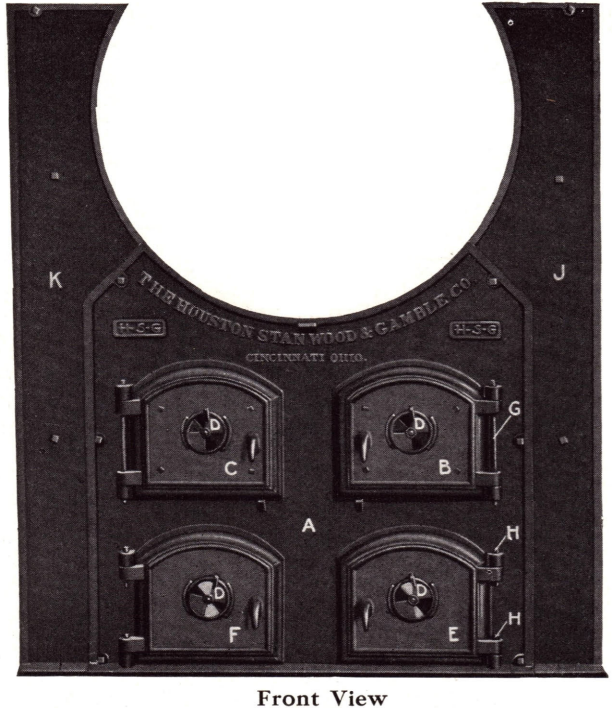
Front for 36-inch diameter boilers has single fire door opening and single ash door opening.

Repair List

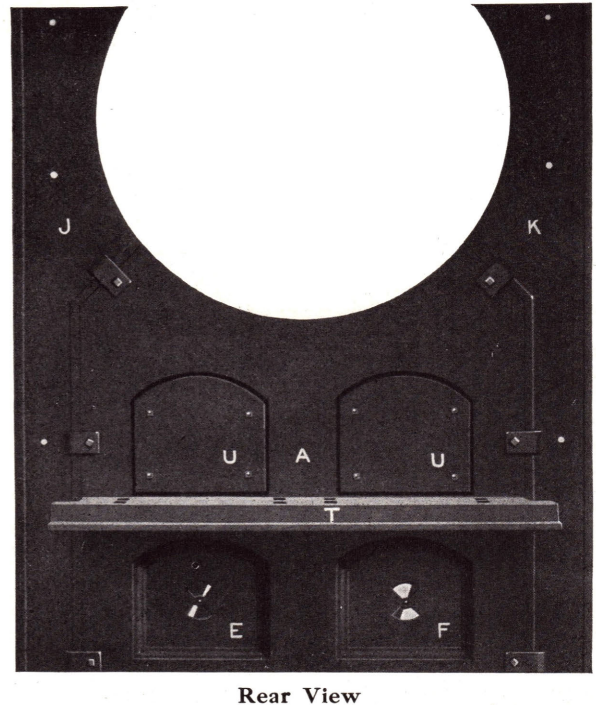
A—Fire front casting with no other parts whatever (if anchor rods are wanted they must be specially mentioned).
B—Right-hand fire door (register and liner will be attached unless ordered omitted.
C—Left-hand fire door (register and liner will be attached unless ordered omitted).
D—Register.
E—Right-hand ash door (register attached).
F—Left-hand ash door (register attached).
G—Pins for fire doors (2).
H—Pins for ash doors (4).
T—Front bearing bar for grates (this is supported by the brick-work and is not fastened to fire front).
U—Liner for fire door.

NOTE—We have patterns for an Extra Heavy Ornamental Half Front.

Three-Quarter Front



Front View



Rear View

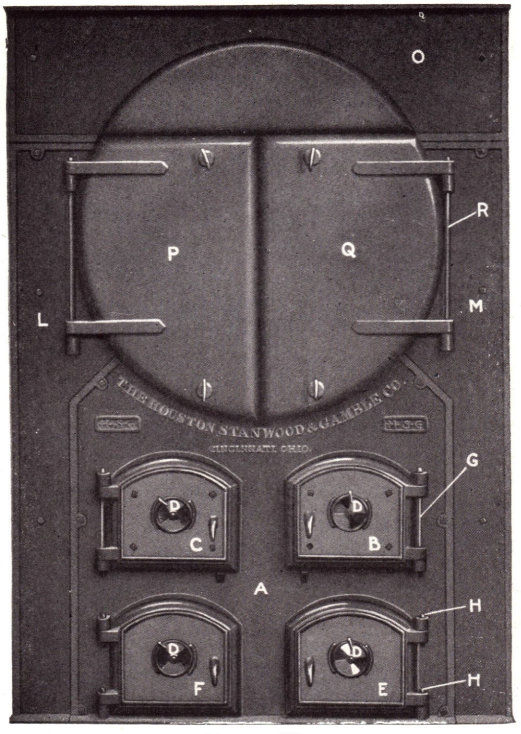
If slabs or other bulky fuel is to be used, one large opening with double doors instead of two separate fire door openings can be furnished, if specially ordered.

Front for 36-inch diameter boilers has single fire door opening and single ash door opening.

Repair List

A—Center piece of fire front with no other parts whatever.
B—Right-hand fire door (register and liner will be attached unless ordered omitted).
C—Left-hand fire door (register and liner will be attached unless ordered omitted).
D—Register.
E—Right-hand ash door (register attached).
F—Left-hand ash door (register attached).
G—Pins for fire doors (2).
H—Pins for ash doors—(4).
J—Right-hand side piece of fire front with bolts to attach to center piece (if anchor rods are wanted they must be specially mentioned).
K—Left-hand side piece of fire front with bolts to attach to center piece (if anchor rods are wanted they must be specially mentioned).
T—Front bearing bar for grates (this is supported by the brickwork and is not fastened to fire front).
U—Liner for fire door.

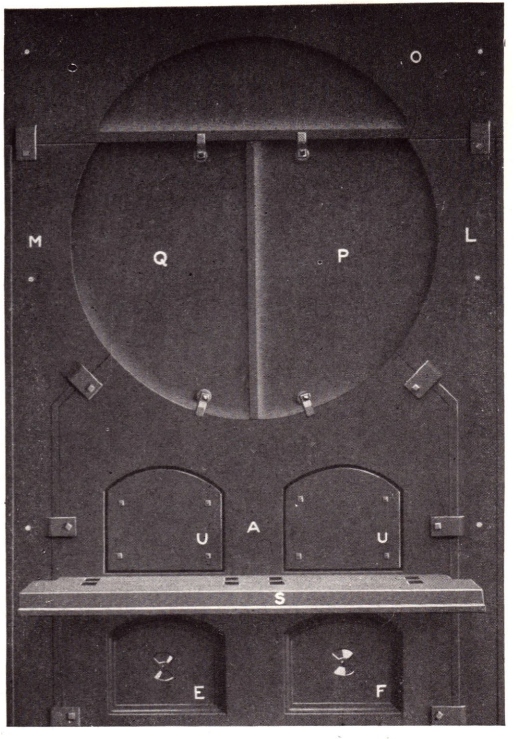
Full Front



Front View

Fronts may be changed to suit mechanical stokers or patent grates by special arrangement with us.

Front for 36-inch diameter boilers has single fire door opening and single ash door opening.



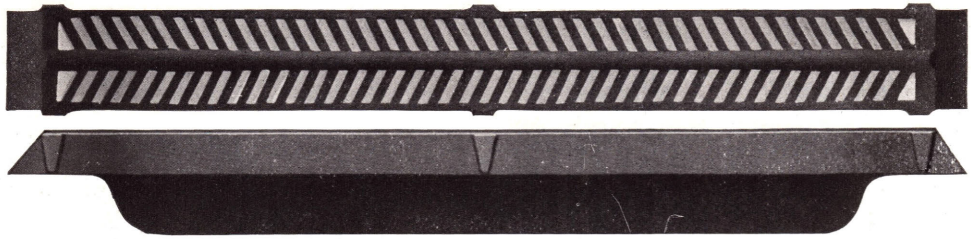
Rear View

REPAIR LIST

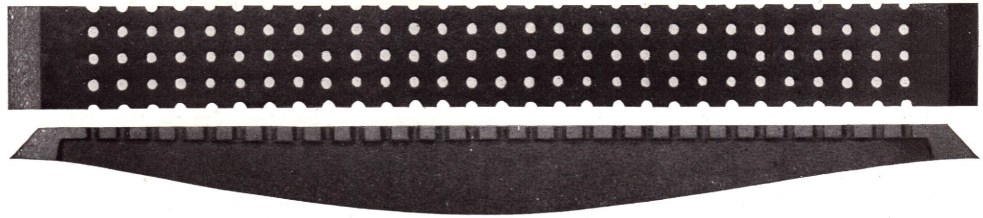
A—Center piece of fire front with no other parts whatever.
B—Right-hand fire door (register and liner will be attached unless ordered omitted).
C—Left-hand fire door (register and liner will be attached unless ordered omitted).
D—Register.
E—Right-hand ash door (register attached).
F—Left-hand ash door (register attached).
G—Pins for fire doors (2).
H—Pins for ash doors (4).
L—Left-hand side piece of fire front with bolts to attach to center piece (*).
M—Right-hand side piece of fire front with bolts to attach to center piece (*).
O—Top piece of fire front with bolts to attach to side pieces (*).
P—Left-hand flue door.
Q—Right-hand flue door.
R—Pins for flue doors (2).
S—Front bearing bar for grates (this is supported by the brickwork and is not fastened to fire front).
U—Liner for fire door.
*If anchor rods are wanted they must be specially mentioned.

NOTE—We have patterns for an Extra Heavy Ornamental Full Front for the larger sizes of boilers.

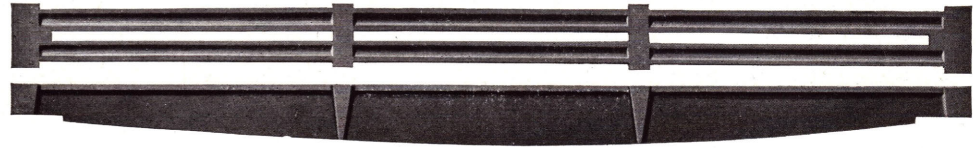
Regular Grates



Tupper or Herringbone Grate Bar



Perforated Sawdust Grate Bar

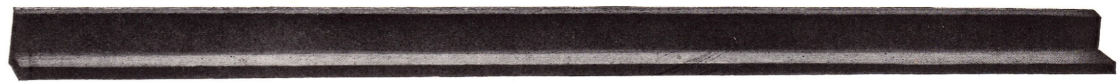


Common or Two-Finger Grate Bar

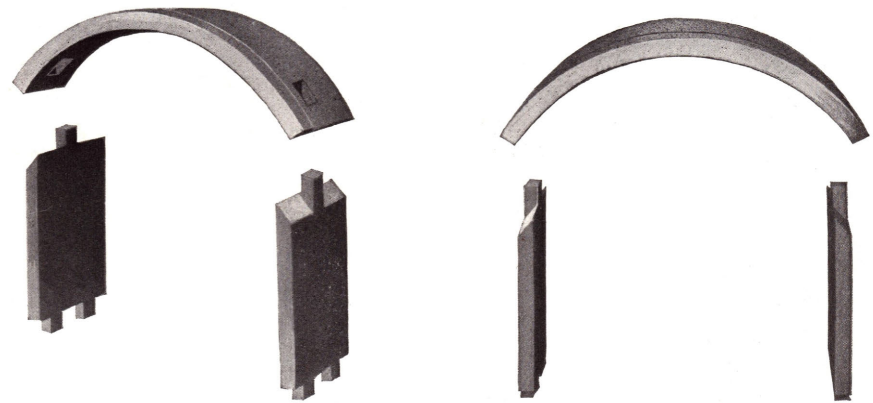
We regularly furnish Tupper grates with all boilers excepting portable boilers for which we furnish Common grates. We furnish either style shown above which customer may specify without change of price however.

Regular Castings

Rear Arch Bars

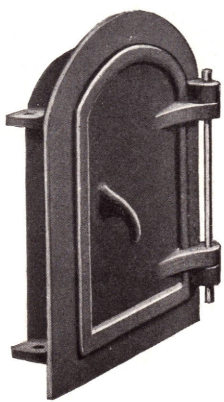


Rear Bearing Bar for Grates

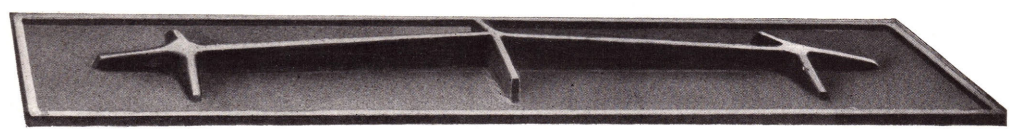


Wall Liners (2) for Fire Door Openings

(These are in sections to facilitate replacing when burned out. The side pieces at lower end fit into holes in front bearing bar.)



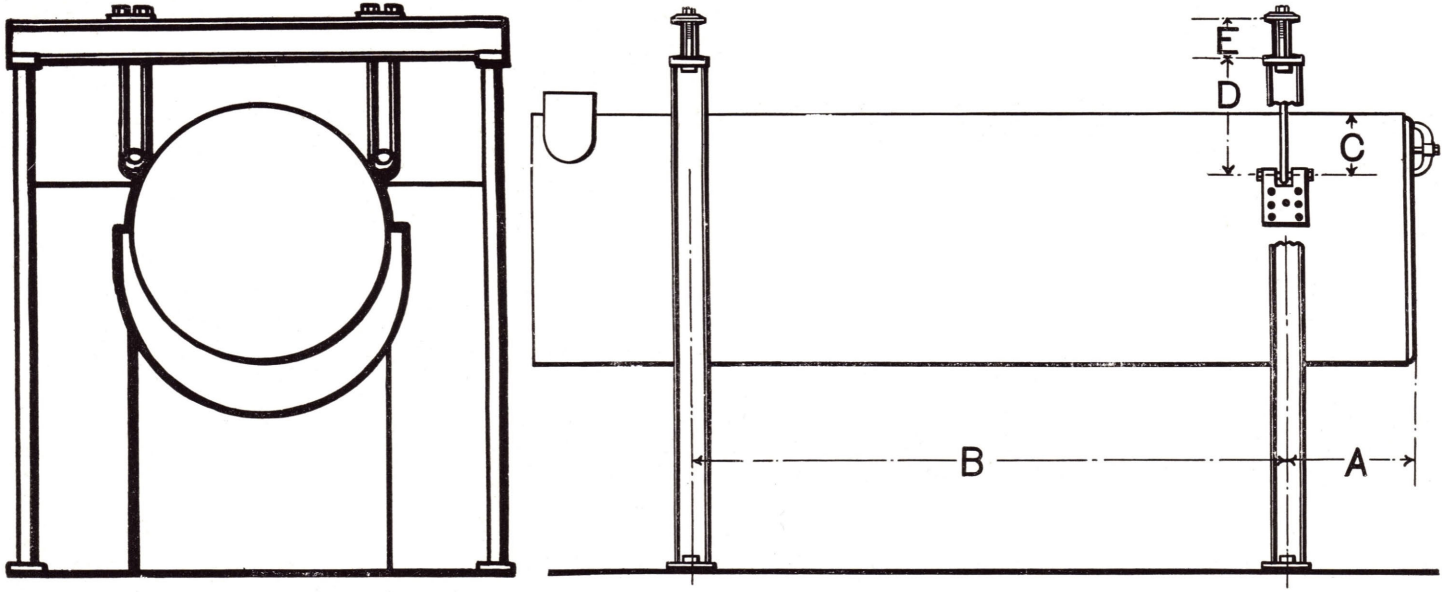
Soot Door



Back Wall Plate (used for boilers 48-inch diameter and smaller)

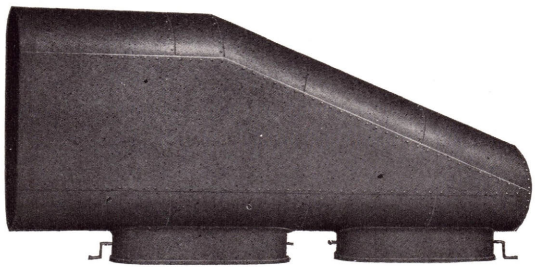
Suspension Apparatus

Hanger Rods (U Bolts), Cross Beams and Columns

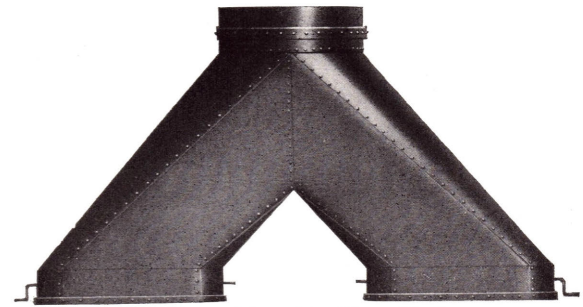


When a boiler is to be suspended, instead of supported by wall brackets resting directly on the walls, our standard arrangement for the larger sizes is as illustrated and consists of four Hartford plate hangers riveted to shell of boiler, four weldless U bolts made from round bar steel, the ends of each U bolt furnished with nuts and passing through the two holes of a heavy washer, these washers resting on top of cross beams, one near each end of boiler, each cross beam consisting of two channel beams bolted together back to back with spacers (the U bolts passing up between the two channels), and these cross beams carried by four columns, two at each side of boiler, each column being an I beam and fitted with cast iron base and cap plates. For smaller sizes, especially when built for stock, the type of loop may sometimes be different. On boilers for 100 pounds in 48″ x 14′ and smaller sizes we use two loops only, one located near each end on top of the shell.

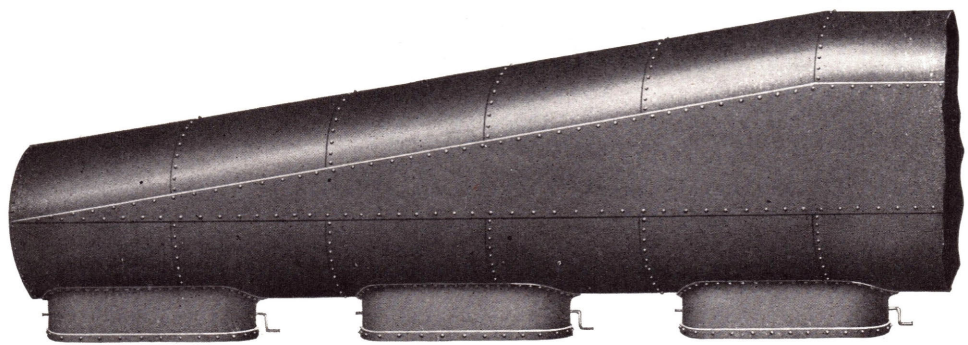
Breechings



Horizontal Breeching for Two Boilers



"Y" Breeching for Two Boilers



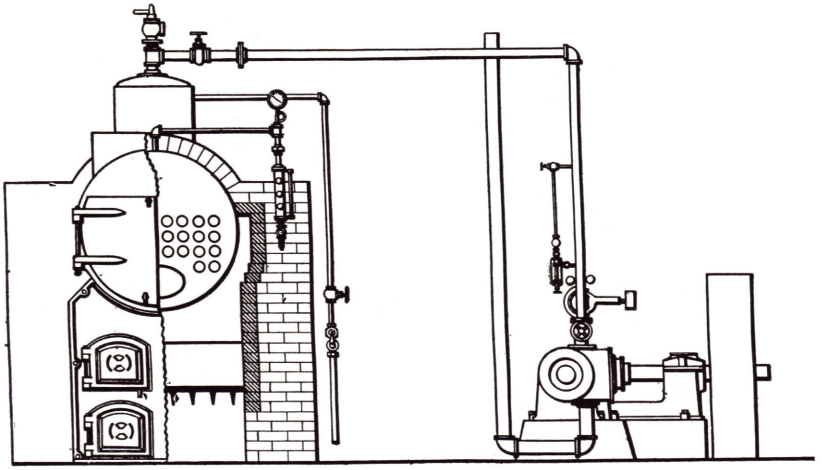
Horizontal Breeching for Three Boilers

The Horizontal Breeching if of regular length extends about two feet outside of brick setting to stack located at one side and may be connected directly to a steel or brick stack or may enter a brick or concrete base under the steel stack. We must be informed as to which arrangement will be used. Damper is placed in the uptake from each boiler in all breechings.

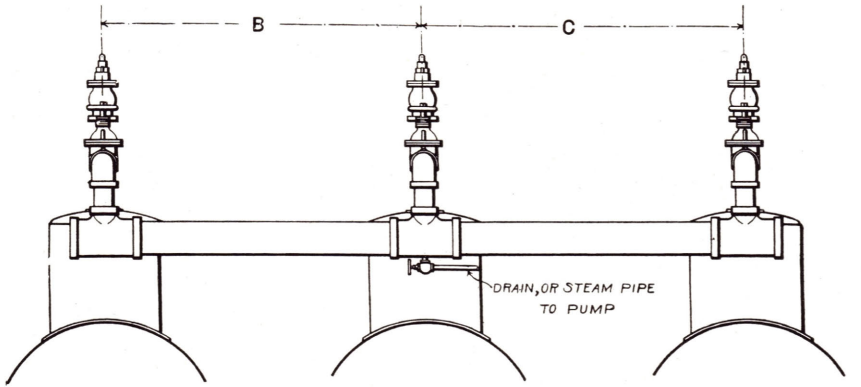
Regular Steam Pipe and Exhaust Pipe

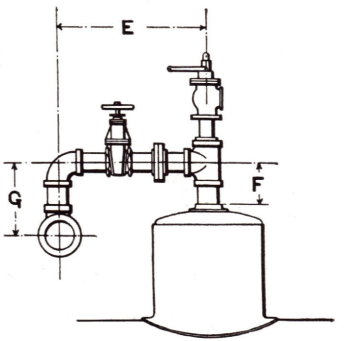
Steam pipe as illustrated is furnished with gate valve and with flange coupling and bolts located near steam outlet of boiler, is cut and threaded per our regular plans, and is long enough to connect engine to boiler when their centers are 10 feet apart. Pipe (fitted) and angle valve for lubricator are included with steam pipe. Exhaust pipe as illustrated is cut and threaded per our regular plans, and extends vertically upward about 16 feet above floor level.

No pipes whatever are furnished with outfits except when specially ordered.



Pipes (or Header) to Connect Together the Steam Outlets of Two or More Boilers

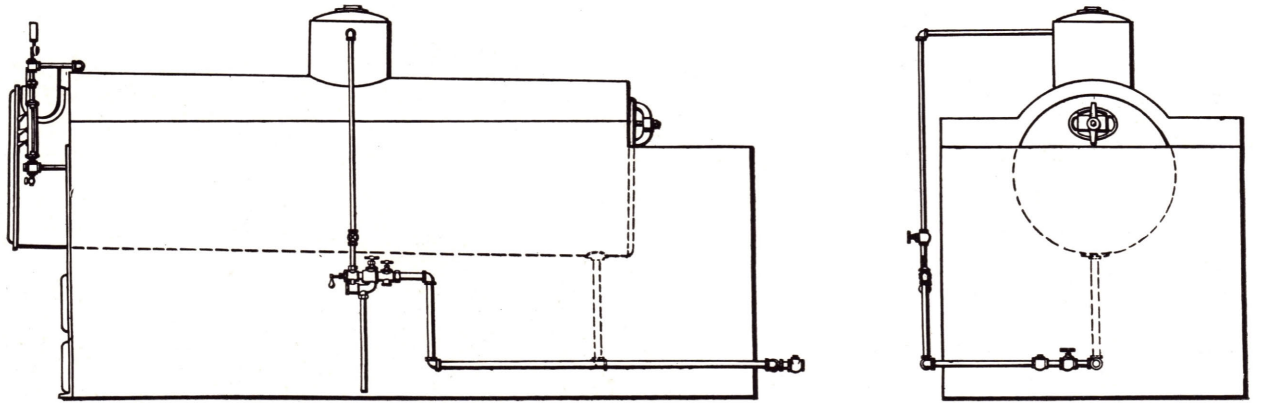




The outlets of boilers should not be rigidly connected, as with the high pressures and temperatures of present day practice it is impossible to maintain tight joints with rigid piping and in some cases disastrous accidents occur from this cause. The piping arrangement illustrated above has a header, to the ends of which the main steam supply lines to engine, etc., are to be connected; and between each boiler and the header, is a flexibly jointed pipe connection containing a pair of flanges and a gate valve. Either boiler of a battery may be shut off from the header. Perfect drainage is provided. The swinging connections to the boilers prevent strains and leaky joints through expansion from heat or movement from settling of the boilers, also allow the erection of the pipe with ease although cut and threaded before shipment.

If boilers are without domes, angle valves may be used if specially ordered and at a higher price; otherwise gate valves will be furnished in all cases.

Regular Pipes for Injector and for Water Column



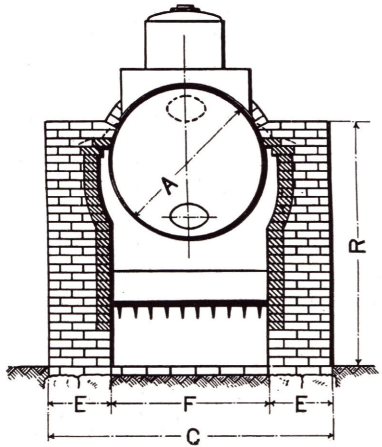
When so ordered an injector is furnished with pipes (not cut or threaded) and fittings to connect same to boiler. Illustration shows arrangement for feeding 100 lbs. boilers. Check, stop and blow-off valves, being part of the regular boiler outfit, are not included with pipes for injector. Blow-off pipe (2½" size cut and threaded) to outside of rear wall and 4 feet of suction pipe are included with injector pipes. Regular connections for water column consist of two crosses with three plugs, one drain cock with bush to fit cross, one union, one tee with bush for steam gauge connection, two elbows and sufficient pipe to connect column to openings in boiler as illustrated. Straightway valves may be inserted between column and boiler (we advise against this because an accident may result from someone closing these valves without the fireman knowing of it), and a full size straightway valve furnished for drain, if specially ordered.

We do not cut and thread the smaller piping (as stated) before shipment (except for portable boilers) unless specially instructed to do so, as it it usually much more satisfactory for customer to cut and fit pipes to suit the particular conditions of his installation, and the work is very easily done. We do not assume responsibility for small piping being satisfactory when cut and threaded before shipment.

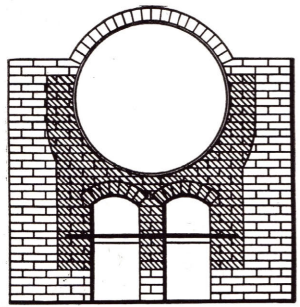
No pipes whatever are furnished with outfits except when specially ordered.

Setting for H-S-G Horizontal Tubular Boilers with Half Fronts or Three-Quarter Fronts

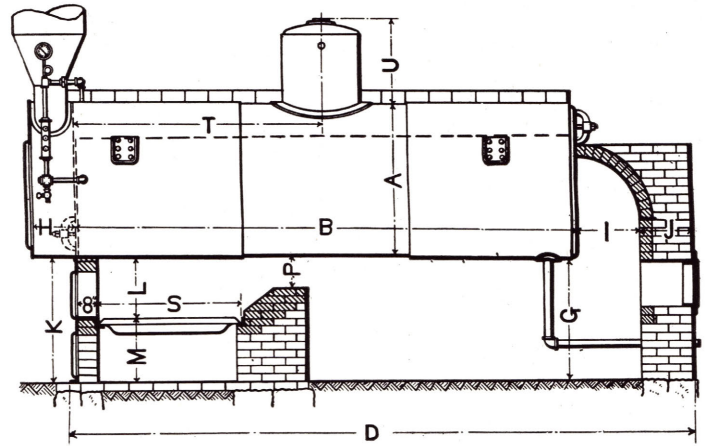
(Detailed plans furnished with boilers)



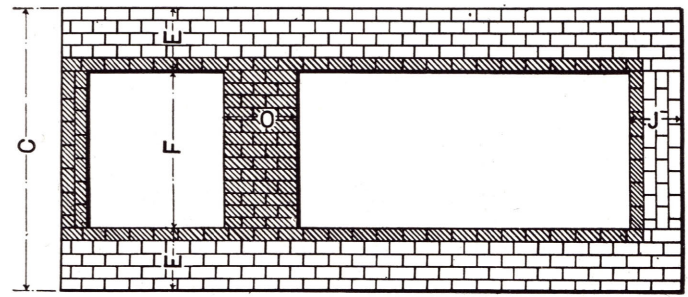
Cross Section Through Furnace



Front End with Fire Front Removed to Show Brick Work



Longitudinal Section



Horizontal Section

Dimensions of Brick Settings for H-S-G Horizontal Tubular Boilers with Half Fronts or Three-Quarter Fronts

Size of Boiler	SETTING FOR ONE BOILER																			SETTING FOR TWO BOILERS (See Note)				Size of Boiler
		(See Note)												(See Note)		(See Note)	(See Note)	Number of Brick (See Note)		Number of Brick (See Note)				
																				With Wall Between Boilers		DEDUCT if Wall between Boilers is Omitted		
A B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R	S	T	U						A B
In. Ft.	In.	Ft. In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.		In.	In.		In.	Fire-Brick	Common Brick	Fire Brick	Common Brick	Fire Brick	Common Brick	In. Ft.
36 x 10	72	12–8	17½	37	41	14	16	13	42	21½	20½	17½	8		73	37		19½	750	4500	1500	7500	600	2000	36 x 10
36 x 12	72	14–8	17½	37	41	14	16	13	42	21½	20½	17½	8		73	37		19½	850	5000	1700	8500	650	2000	36 x 12
44 x 10	78	13–2½	17½	43	45½	15	18	17½	46½	24	22½	22	10		83	37		24¼	1000	5500	1900	9500	700	2500	44 x 10
44 x 12	84	15–2½	17½	49	45½	15	18	17½	46½	24	22½	22	10		83	37		24¼	1100	6500	2200	10000	800	2000	44 x 12
44 x 14	78	17–2½	17½	43	45½	15	18	17½	46½	24	22½	22	10		83	49		24¼	1200	7000	2400	12000	900	3000	44 x 14
48 x 12	93	15–2½	22	49	45	15	18	17½	46½	24	22½	26	10		87	49		25½	1200	8000	2400	12000	800	2500	48 x 12
48 x 14	93	17–2½	22	49	45	15	18	17½	46½	24	22½	26	10		87	49		25½	1400	9000	2700	13500	1000	3000	48 x 14
54 x 14	99	17–8½	22	55	47	17	24	17½	48½	24	24½	26	12		96	49		30	1600	10000	3100	16500	1100	4500	54 x 14
54 x 16	99	19–8½	22	55	47	17	24	17½	48½	24	24½	26	12		96	55		30	1700	11000	3400	18500	1300	5000	54 x 16
60 x 16	113	20–1	26	61	47	17½	24	22	48½	24	24½	26	12		99	55		31¾	1800	14000	3500	22000	1300	5500	60 x 16
60 x 18	113	22–1	26	61	47	17½	24	22	48½	24	24½	26	12		99	61		31¾	1900	15000	3800	24000	1400	6000	60 x 18
66 x 16	119	20–1	26	67	54	18	24	22	55½	31	24½	26	14		110	61		35¾	2100	15500	4200	25000	1500	6000	66 x 16
66 x 18	119	22–1	26	67	54	18	24	22	55½	31	24½	26	14		110	61		35¾	2300	17000	4500	27000	1700	7000	66 x 18
72 x 16	123	20–1	28	67	54	19	24	22	55½	31	24½	30	14		113	73		39¼	2300	16000	4500	27000	1600	8000	72 x 16
72 x 18	125	22–1	26	73	54	19	24	22	55½	31	24½	30	14		113	73		39¼	2500	17500	4900	28000	1700	7000	72 x 18
78 x 18	131	22–1	26	79	57½	24	24	22	59	34	25	30	14		122	73		39½	2800	19000	5500	30500	2000	7000	78 x 18
78 x 20	131	24–1	26	79	57	24	24	22	59	34	25	30	14		122	73		39½	3000	20500	5900	33000	2100	8000	78 x 20
84 x 18	145	22–1	30	85	57½	24	24	22	59	34	25	30	14		126	73		40	3000	22500	6000	34500	2100	7500	84 x 18

(D) Length of setting over all (D) includes 4 inches space for the fire front at the front end outside of brickwork.

(Q) Thickness of lining of fire front is the length of one fire brick.

(S) Grates over 60 inches long are in two lengths with middle bearing bar (length over all of grates is one inch less than dimension S).

(T) Obtain plan from us showing location of dome (or of flanges for steam supply and safety valve outlets on boilers without domes) as this dimension depends on the design of the boiler.

(U) Height of dome is only approximate.

Distance between centers of two adjacent boilers in a battery with wall between them in the case of 54-inch diameter and larger boilers will be diameter of one boiler plus 31 inches and in the case of smaller boilers will be diameter of one boiler plus 25 inches. Thickness of wall between boilers at level of grates will be 30 inches for boilers 54 inches and larger and 24 inches for smaller sizes excepting that with regular grates thickness will be 36 inches for 72″ x 16′ size, 26 inches for 44″ x 14′ and 44″ x 10′ sizes, and 20 inches for 44″ x 12′ size. When boilers are suspended and have loops instead of wall brackets the wall between boilers may be omitted and the distance between centers of two adjacent boilers will then be diameter of one boiler plus 7 inches, in the case of all sizes.

Number of common brick is estimated on basis of approximately 18 brick per cubic foot and full allowance must be added for all breakage and cutting. Material for foundation is not included. Paving (common brick on edge) for ash pit and for soot pit back of bridge wall is included.

Number of fire brick includes header in every sixth course of the lining of side and rear walls.

Boiler should be located so that the circumferential row of rivets for the front head are just outside (in front of) the fire front. Boiler should not rest on fire front but must everywhere be separated from same by a fraction of an inch. Fire front with its anchor rods should be placed in position, bolted together and properly plumbed before building brickwork. Care must be taken to avoid springing the fire front castings out of shape, by drawing up too tightly with the bolts or otherwise, in order that the doors may fit closely.

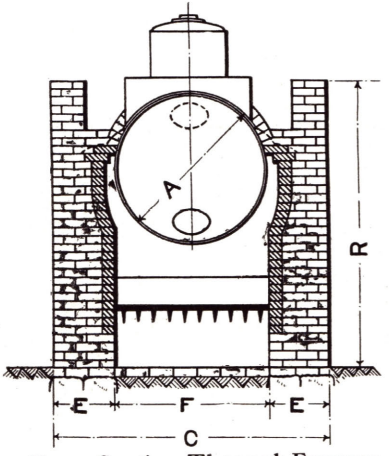
The under side of rear arch bars (back wall plate used for boilers 48 inches diameter and smaller) at point of contact with boiler should be one inch above top row of tubes.

Space between side wall and shell of boiler at height of center of boiler should be 4 inches for boilers of 54 inches diameter and larger, and 3 inches for smaller sizes. Side walls should cover over this space and come in contact with boiler shell 3 inches below bottom of wall brackets (the under side of wall brackets in this way being protected from the hot gases by one course of fire brick); or if boiler has loops for suspension instead of wall brackets, the side walls should cover over and come in contact with shell at height of top row of tubes.

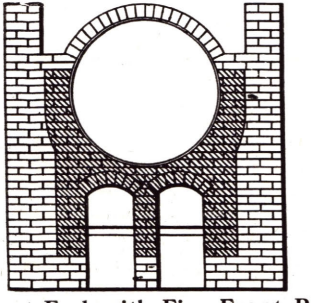
Detailed setting plan furnished with boiler.

Setting for H-S-G Horizontal Tubular Boilers with Full Fronts

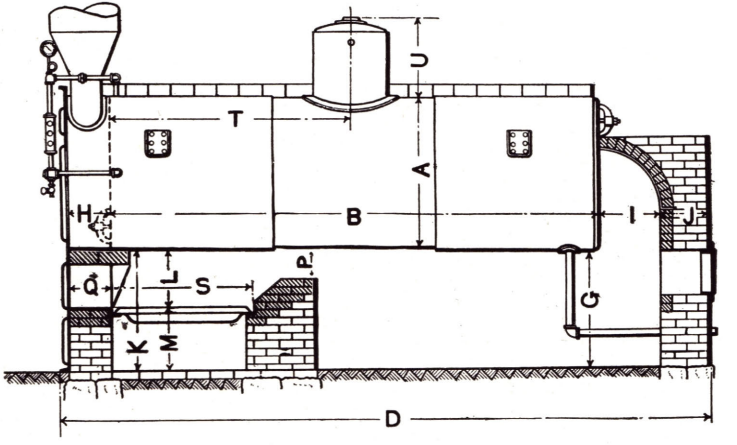
(Detailed plans furnished with Boilers)



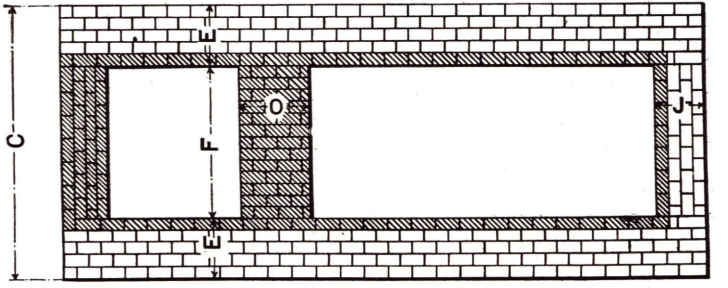
Cross Section Through Furnace



Front End with Fire Front Removed to Show Brick Work



Longitudinal Section



Horizontal Section

Dimensions of Brick Settings for H-S-G Horizontal Tubular Boilers with Full Fronts

Size of Boiler		SETTING FOR ONE BOILER																		Number of Brick (See Note)		SETTING FOR TWO BOILERS (See Note) Number of Brick (See Note)				Size of Boiler
			(See Note)												(See Note)		(See Note)	(See Note)	(See Note)			With Wall Between Boilers		DEDUCT if Wall Between Boilers is Omitted		
A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R	S	T	U	Fire Brick	Common Brick	Fire Brick	Common Brick	Fire Brick	Common Brick	A	B
In.	Ft.	In.	Ft. In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.		In.							In.	Ft.
36	x 10	72	13–11	17½	37	41	14	16	13	42	21½	20½	17½	8	16	81	37		19½	800	5000	1600	8000	600	2000	36	x 10
36	x 12	72	15–11	17½	37	41	14	16	13	42	21½	20½	17½	8	16	81	37		19½	900	5500	1800	9000	700	2500	36	x 12
44	x 10	78	14– 6½	17½	43	45½	15	18	17½	46½	24	22½	22	10	16	96	37		24¼	1000	6500	2000	11000	700	3000	44	x 10
44	x 12	84	16– 6½	17½	49	45½	15	18	17½	46½	24	22½	22	10	16	96	37		24¼	1200	7500	2300	11500	900	2000	44	x 12
44	x 14	78	18– 6½	17½	43	45½	15	18	17½	46½	24	22½	22	10	16	96	49		24¼	1300	8000	2500	13500	1000	3500	44	x 14
48	x 12	93	16– 6½	22	49	45	15	18	17½	46½	24	22½	26	10	16	96	49		25½	1300	9000	2500	14000	900	3000	48	x 12
48	x 14	93	18– 6½	22	49	45	15	18	17½	46½	24	22½	26	10	16	96	49		25½	1400	10000	2800	15500	1000	3500	48	x 14
54	x 14	99	19– 2½	22	55	47	17	24	17½	48½	24	24½	26	12	16	113½	49		30	1700	12000	3300	19500	1200	5000	54	x 14
54	x 16	99	21– 2½	22	55	47	17	24	17½	48½	24	24½	26	12	16	133½	55		30	1800	13000	3600	21000	1300	5500	54	x 16
60	x 16	113	21– 7½	26	61	47	17½	24	22	48½	24	24½	26	12	16	113½	55		31¾	1900	16000	3800	25000	1400	6000	60	x 16
60	x 18	113	23– 7½	26	61	47	17½	24	22	48½	24	24½	26	12	16	113½	61		31¾	2100	17000	4100	27000	1500	6500	60	x 18
66	x 16	119	21– 8	26	67	54	18	24	22	55½	31	24½	26	14	16	130	61		35¾	2200	18000	4400	28500	1600	6500	66	x 16
66	x 18	119	23– 8	26	67	54	18	24	22	55½	31	24½	26	14	16	130	61		35¾	2400	20000	4800	31000	1800	7000	66	x 18
72	x 16	123	21– 9	28	67	54	19	24	22	55½	31	24½	30	14	16	130	73		39¼	2400	18500	4800	31000	1700	8500	72	x 16
72	x 18	125	23– 9	26	73	54	19	24	22	55½	31	24½	30	14	16	130	73		39¼	2600	20500	5200	32000	1900	7000	72	x 18
78	x 18	131	23– 9	26	79	57½	19	24	22	59	34	25	30	14	16	148	73		39½	2900	23000	5800	35500	2000	8000	78	x 18
78	x 20	131	25– 9	26	79	57	19	24	22	59	34	25	30	14	16	148	73		39½	3100	24500	6200	38000	2200	8500	78	x 20
84	x 18	145	23– 9	30	85	57½	19	24	22	59	34	25	30	14	16	148	73		40	3200	26000	6300	39500	2200	8000	84	x 18

(D) Length of setting over all (D) includes four inches space for the fire front at front end outside of brick work.

(Q) Brick lining of fire front should be corbeled out and where it comes in contact with the boiler should project 4 inches to the rear of the rivets of front head so as to protect the seam from the fire.

(S) Grates over 60 inches long are in two lengths with middle bearing bar (length over all of grates is one inch less than dimension S).

(T) Obtain plan from us showing location of dome (or of flanges for steam supply and safety valve outlets on boilers without domes) as this dimension depends upon the design of the boiler.

(U) Height of dome is only approximate.

Distance between centers of two adjacent boilers in a battery with wall between them in the case of 54-inch diameter and larger boilers will be diameter of one boiler plus 31 inches and in the case of smaller boilers will be diameter of one boiler plus 25 inches. Thickness of wall between boilers at level of grates will be 30 inches for boilers 54 inches and larger and 24 inches for smaller sizes excepting that with regular grates, thickness will be 36 inches for 72″ x 16′ size, 26 inches for 44″ x 14′ and 44″ x 10′ sizes, and 20 inches for 44″ x 12′ size. When boilers are suspended and have loops instead of wall brackets, the wall between boilers may be omitted and the distance between centers of two adjacent boilers will then be diameter of one boiler plus 7 inches, in the case of all sizes.

Number of common brick is estimated on basis of approximately 18 brick per cubic foot and full allowance must be added for all breakage and cutting. Material for foundation is not included. Paving (common brick on edge) for ash pit and for soot pit back of bridge wall is included.

Number of fire brick includes header in every sixth course of the lining of side and rear walls.

Fire front with its anchor rods should be placed in position, bolted together and properly plumbed before building brickwork. Care must be taken to avoid springing the fire front castings out of shape, by drawing up too tightly with the bolts or otherwise, in order that the doors may fit closely.

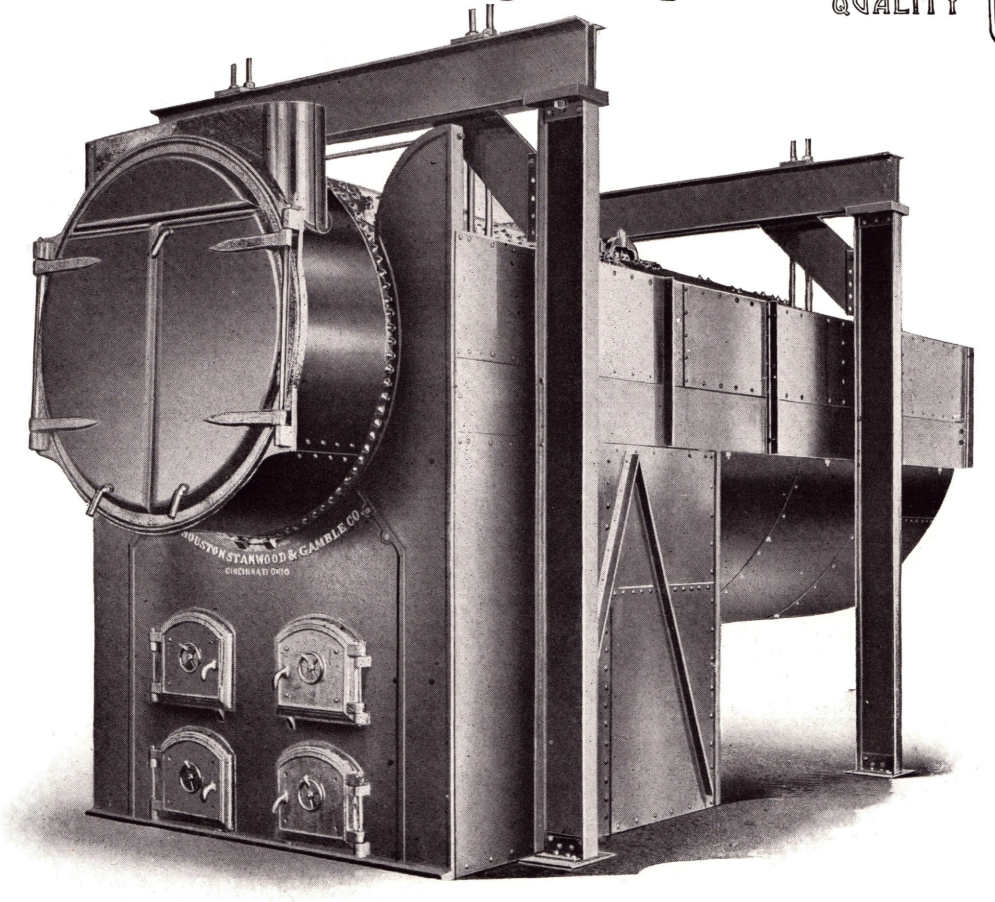
The under side of rear arch bars (back wall plate used for boilers 48 inches diameter and smaller) at point of contact with boiler should be one inch above top row of tubes.

Space between side wall and shell of boiler at height of center of boiler should be 4 inches for boilers of 54 inches diameter and larger, and 3 inches for smaller sizes. Side walls should cover over this space and come in contact with boiler shell 3 inches below bottom of wall brackets (the under side of wall brackets in this way being protected from the hot gases by one course of fire brick); or if boiler has loops for suspension instead of wall brackets, the side walls should cover over and come in contact with shell at height of top row of tubes.

Detailed setting plan furnished with boiler.

Steel Casing Setting

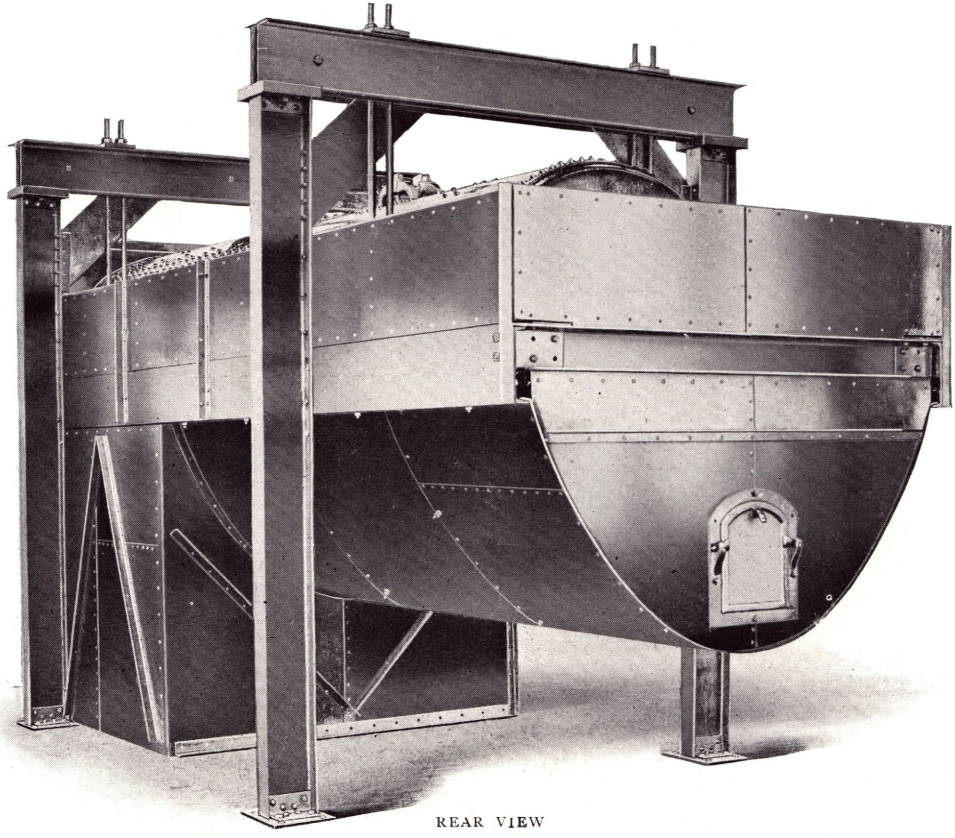
QUALITY H-S-G TRADE MARK.



FRONT VIEW

With Regular Furnace. Standard Setting. Boiler Suspended

Steel Casing Setting

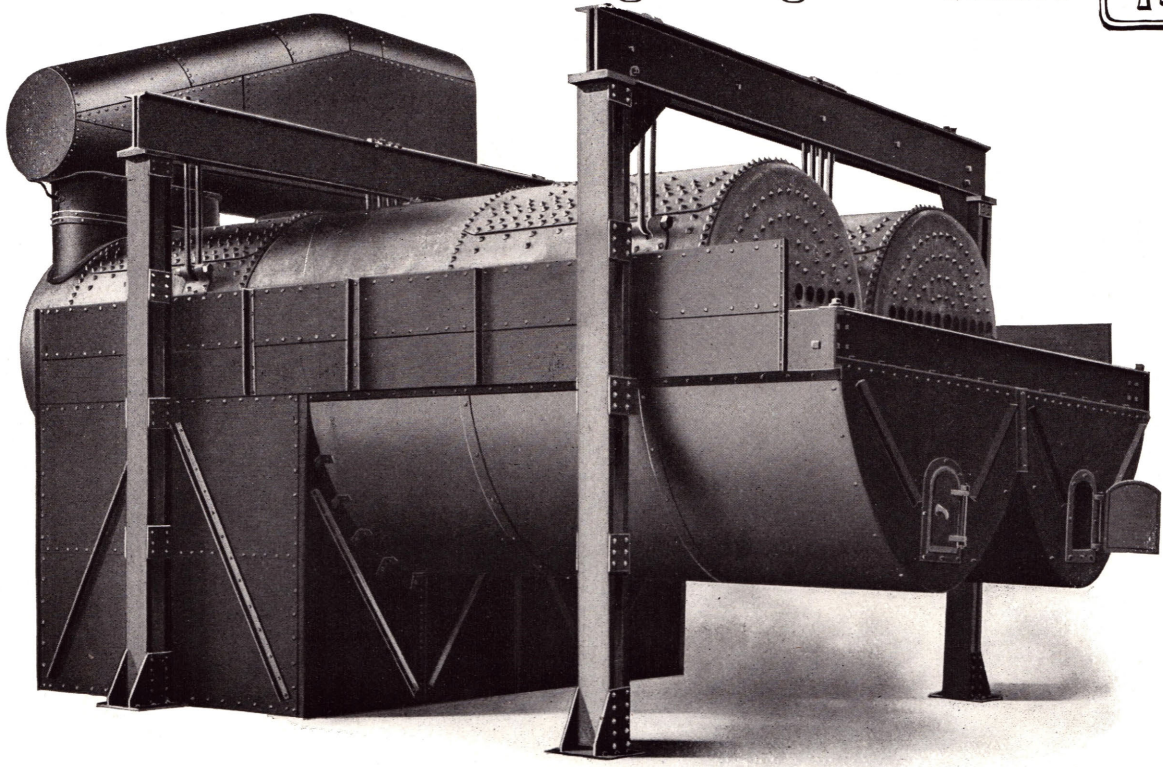


REAR VIEW

With Regular Furnace. Standard Setting. Boiler Suspended

Steel Casing Setting

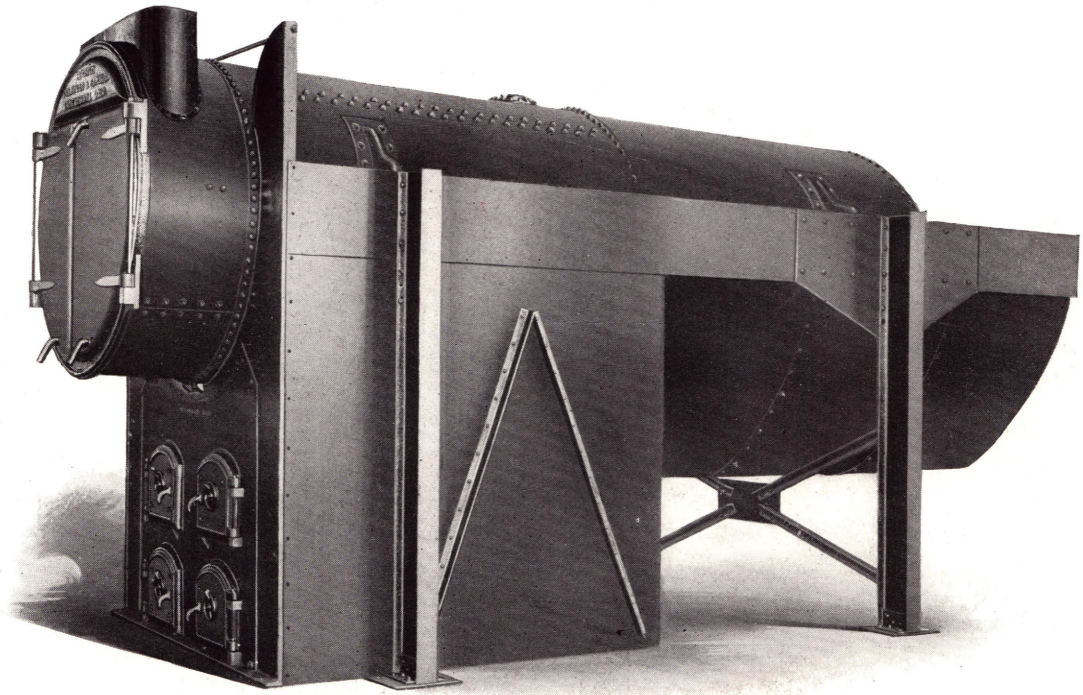
QUALITY H-S-G TRADE MARK.



Two Boilers in a Battery with Combined Furnace extending Full Width

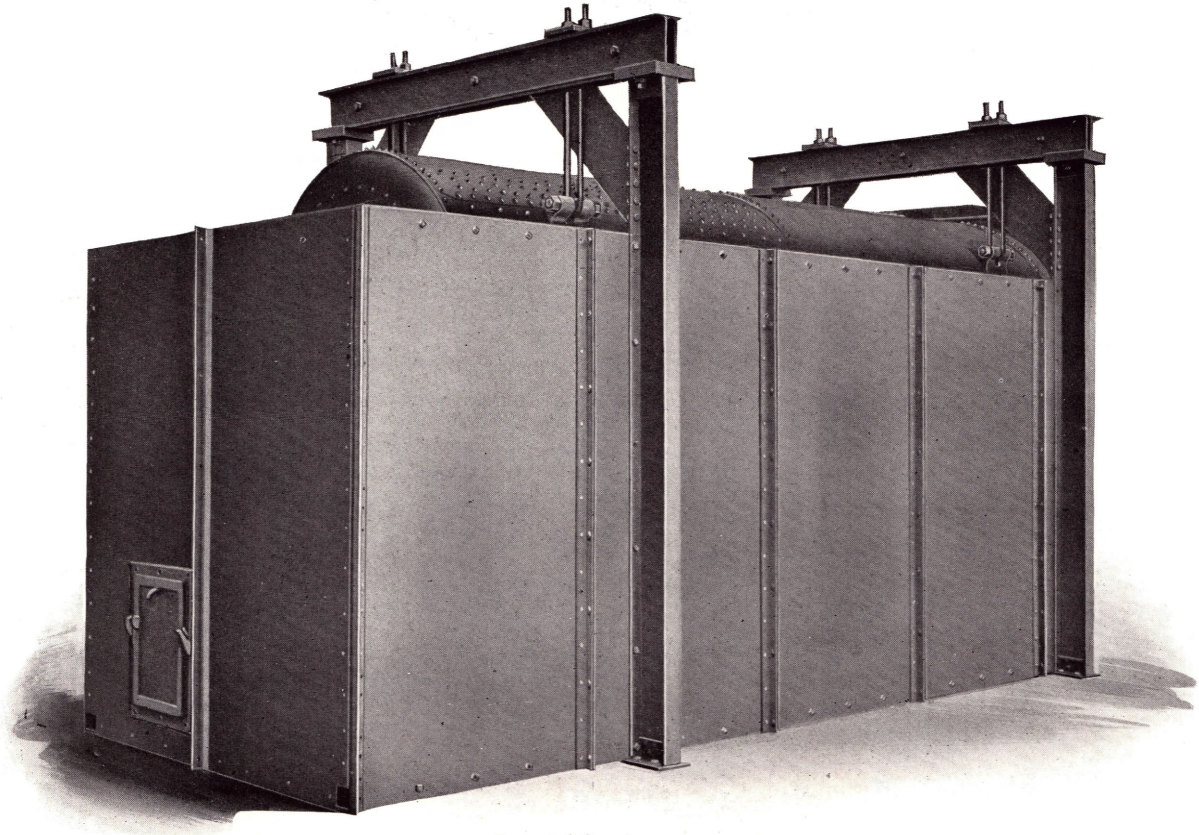
NOTE—It is not necessary to use a horizontal breeching as illustrated unless it is desired to have but one stack placed at the side.

Steel Casing Setting



With Regular Furnace. Standard Setting. Boiler Supported by Brackets

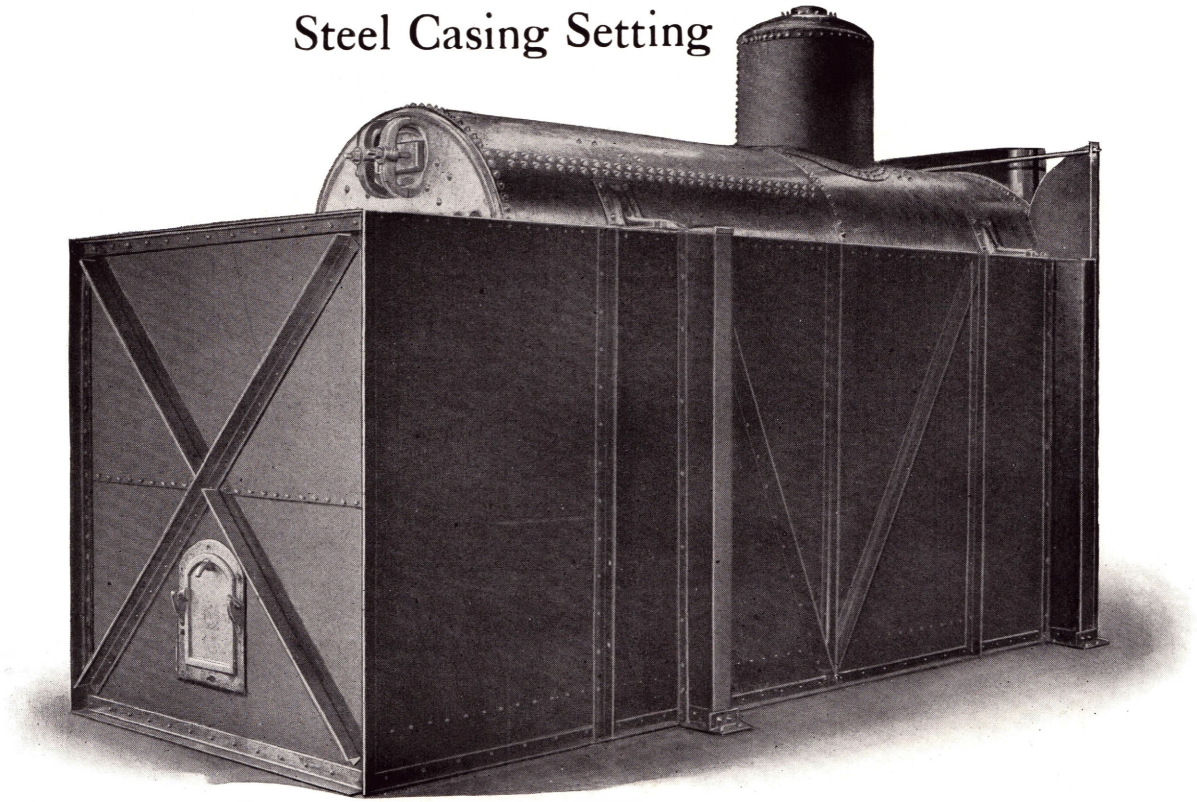
Steel Casing Setting



Special Setting

Casing with vertical walls reaching to floor level at sides and rear, as well as at front. Boiler suspended.

Steel Casing Setting

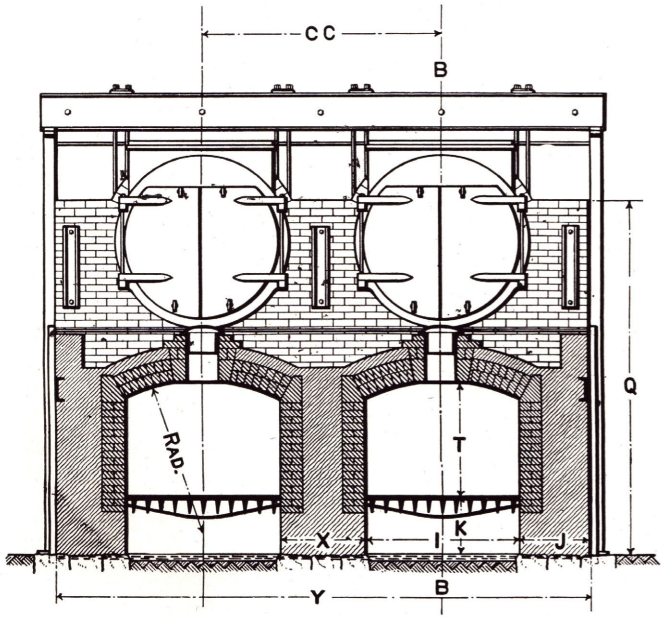


Special Setting

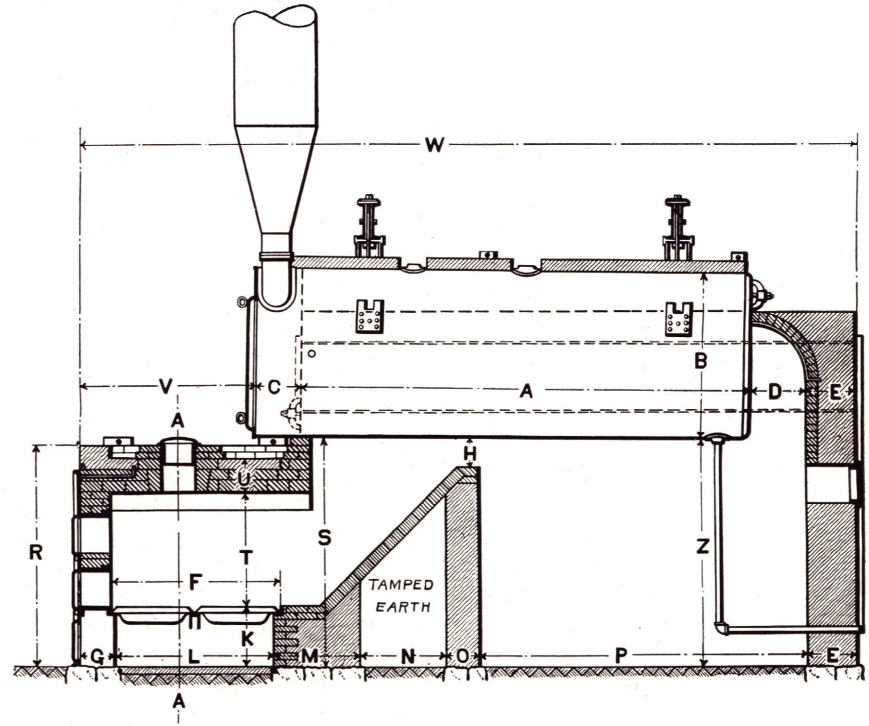
Casing with vertical walls reaching to floor level at sides and rear, as well as at front. Boiler supported by Brackets.

H-S-G Dutch Oven Furnace Settings

(Detailed plans furnished with Boilers)



Cross Section at AA



Longitudinal Section at BB

(NOTE—See page 32 for exterior views of setting.)

Dimensions of H-S-G TRADE MARK Dutch Oven Furnace Settings for One or for Two Boilers

Size of Boiler																																					Setting for Only ONE BOILER (See Note)		Setting for TWO BOILERS IN A BATTERY (See Note)				Size of Boiler	
B	A	C	D	E (See Note)	F (See Note)	G	H	I	J Length of Furnace Arch (See Note)		Thickness Side Walls Back of Furnace (See Note)	K	L	M (See Note)	N	O	P		Q		R	S	T	Radius of Arch over Furnace	U	V	W (See Note)		* X Thickness Wall Between Boilers Back of Furnace (See Note)	* Y		† Width Over all of Setting for One Boiler Only		* Z	CC	Fire Brick	Common Brick	Fire Brick	Common Brick	DEDUCT if Wall Between Boilers is Omitted (Wall Between Furnaces Cannot be Omitted. See Note) Fire Brick	DEDUCT if Wall Between Boilers is Omitted (Wall Between Furnaces Cannot be Omitted. See Note) Common Brick	B	A
In.	Ft.	In.	In.	In.	In.	In.	In.	In.	Ft.	In.	In.	In.	In.	In.	In.	In.	Ft.	In.	Ft.	In.	In.	In.	In.	In.	In.	In.	Ft.	In.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.							In.	Ft.
44	x 12	15	18	17½	73	14	15	43	17½	8	9	17½	25	68½	22	27	17½	9	4	9	11	81	83	40	43	13	84	23	2½	26	22	12	3	6	6	82	5	9	2800	11500	5600	19000	1000	4000	44	x 12
44	x 14	15	18	17½	73	14	15	43	17½	8	9	17½	25	68½	22	27	17½	11	4	9	11	81	83	40	43	13	84	25	2½	26	22	12	3	6	6	82	5	9	3000	12500	6000	20500	1200	4500	44	x 14
48	x 12	15	18	17½	73	14	15	43	24	8	9	22	25	68½	22	27	17½	9	4	10	3	81	83	40	43	13	84	23	2½	30	22	13	8	7	7	81½	6	1	2900	15000	5800	23000	1100	4000	48	x 12
48	x 14	15	18	17½	73	14	15	43	24	8	9	22	25	68½	22	27	17½	11	4	10	3	81	83	40	43	13	84	25	2½	30	22	13	8	7	7	81½	6	1	3000	16000	6000	25000	1200	5000	48	x 14
54	x 14	17	24	17½	73	14	18	49	25	8	11	22	25	68½	22	27	17½	12	0	11	0	83	85	42	49	13	84	25	10½	36	26	15	4	8	3	83½	7	1	3400	18000	6800	29000	1400	6000	54	x 14
54	x 16	17	24	17½	73	14	18	49	25	8	11	22	25	68½	22	27	17½	14	0	11	0	83	85	42	49	13	84	27	10½	36	26	15	4	8	3	83½	7	1	3600	19000	7200	31000	1600	7000	54	x 16
60	x 16	17½	24	22	73	14	18	55	28	8	11	26	25	68½	22	30	22	13	5	11	5	85	87	44	55	13	84	28	3½	36	26	16	10	9	3	85½	7	7	3800	24000	7600	37000	1700	7000	60	x 16
60	x 18	17½	24	22	73	14	18	55	28	8	11	26	25	68½	22	30	22	15	5	11	5	85	87	44	55	13	84	30	3½	36	26	16	10	9	3	85½	7	7	4000	25500	8000	39000	1900	7000	60	x 18
66	x 16	18	24	22	73	14	21	61	28	9	0	26	25	68½	22	30	22	13	5½	11	10	86	88	45	61	13	84	28	4	36	26	17	10	9	9	86½	8	1	4200	25000	8400	39000	1800	7000	66	x 16
66	x 18	18	24	22	73	14	21	61	28	9	0	26	25	68½	22	30	22	15	5½	11	10	86	88	45	61	13	84	30	4	36	26	17	10	9	9	86½	8	1	4400	27000	8800	41000	1800	8000	66	x 18
72	x 16	19	24	22	73	14	21	67	28	9	1	26	25	68½	22	30	22	13	6½	12	3	88	90	47	67	13	84	28	5	36	26	18	10	10	3	88½	8	7	4500	26500	9000	41000	2000	8000	72	x 16
72	x 18	19	24	22	73	14	21	67	28	9	1	26	25	68½	22	30	22	15	6½	12	3	88	90	47	67	13	84	30	5	36	26	18	10	10	3	88½	8	7	4800	28000	9600	43000	2300	8000	72	x 18
78	x 18	24	24	22	73	14	21	73	28	9	6	26	25	68½	22	30	22	15	11½	12	10	89	91	48	73	13	84	30	10	36	26	19	10	10	9	89½	9	1	5100	29500	10200	46000	2300	9000	78	x 18
78	x 20	24	24	22	85	14	21	73	28	10	6	26	25	80½	22	30	22	17	11½	13	1	92	94	51	73	13	96	33	10	36	26	19	10	10	9	92	9	1	5700	32500	11400	50000	2600	9000	78	x 20
84	x 18	24	24	22	85	14	21	74	34½	10	6	26	25	80½	22	30	22	15	11½	13	5	92	94	51	73	13	96	31	10	42	30	21	5	11	10	92½	9	7	5800	33500	11600	53000	2600	10000	84	x 18

* † Dimensions marked by asterisk (*) apply only to setting for two boilers, and dimensions marked by dagger (†) apply only to single setting.

(F) Grates are in two lengths with middle bearing bar. Grate bars are 36 inches in length except for 78" x 20' and 84" x 18' boilers which have grate bars 42 inches long.

(G) Dimension G gives thickness of front wall of furance below the level of front bearing bar. Depth of arches for fire door openings and distance from rear face of fire front to front end of grates is 12 inches.

"Length of Furnace Arch" is the distance from the fire front to rear end of the brick arch over the furnace.

"Thickness Side Walls Back of Furnace" refers to the thickness of the outer side walls of boiler setting back of the rear end of the arch over furnace.

The cross wall under front end of boiler, resting on top of furnace arch at rear end of arch, should be 13 inches thick and should project about 8 inches back of circumferential row of rivets of front head so as to protect the seam from the fire.

(M) Bridge wall should be flush with top of grate bars for 12 inches back of grates.

(W) Dimension W (length of brick work) does not include the space occupied by the fire front which is 3⅓ inches.

"Thickness Wall Between Boilers Back of Furnace" refers to the thickness of wall between two boilers back of the rear end of the arch over furnace.

Fire brick lining back of the bridge wall should extend down to 48 inches above floor level.

The under side of rear arch bars (back wall plate used for boilers 48 inches diameter and smaller) at point of contact with boiler should be one inch above top row of tubes

Space at each side between wall and shell of boiler at height of center of boiler should be 4 inches for boilers of 54 inches diameter and larger, and 3 inches for smaller sizes. Walls should cover over this space and come in contact with boiler shell 3 inches below bottom of wall brackets (the under side of wall brackets in this way being protected from the hot gases by one course of fire brick); or if boiler has loops for suspension instead of wall brackets, the side walls should cover over and come in contact with shell at height of top row of tubes.

Firing pot is approximately 13½ inches diameter inside and 15 inches diameter outside. A circular fire clay curb 9 inches deep should be built into the fire brick arch over furnace and the cast iron firing pot or curb placed on top of this. Depth of casting is 8 inches and distance from top of casting to inside of arch, 17 inches.

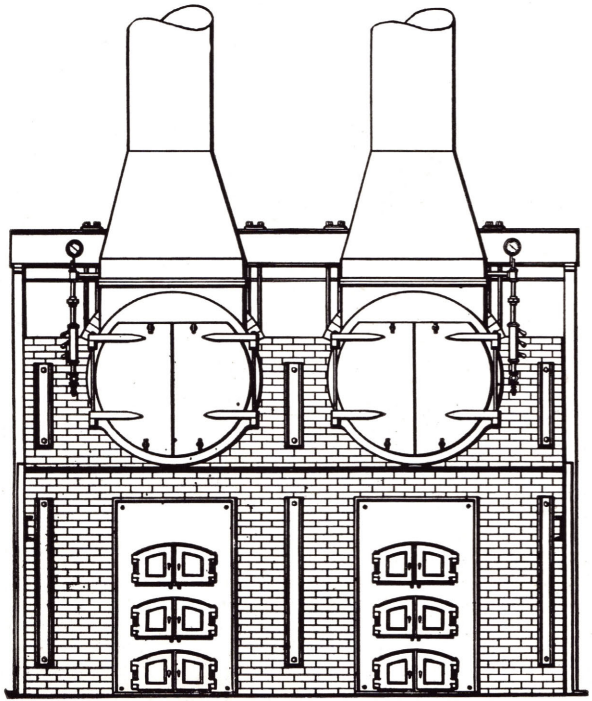
Number of common brick is estimated on basis of approximately 18 brick per cubic foot aud full allowance must be added for all breakage and cutting. Material for foundation is not included. Paving (common brick on edge) is included for ash pit only.

Number of fire brick includes header in every sixth course of the lining of side and rear walls.

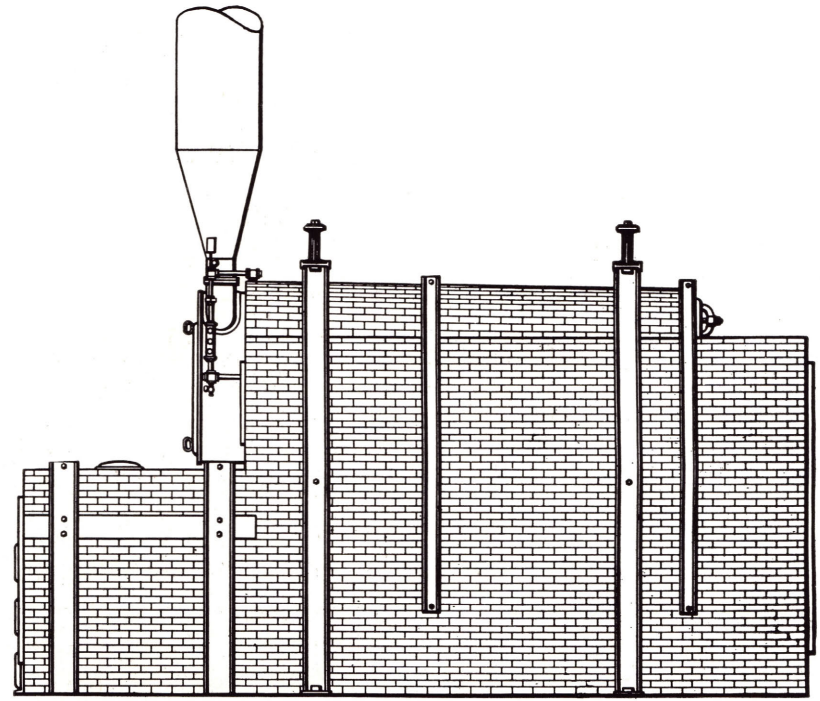
It is difficult to build Dutch oven without division walls and a separate furnace for each boiler, unless some other means than an arch is used to cover top of furnace, the width of the combined furnaces being too great for an arch to be practicable. However, in the rear of the furnace arch the wall between two boilers may be omitted without difficulty and the distance between centers of boilers made equal to diameter of one boiler plus 7 inches, the boilers necessarily having loops instead of wall brackets and being suspended from above. The wall between the furnaces may then be reduced in thickness to 27 inches for boilers 60 inches diameter and larger and to 22 inches thickness for smaller sizes. Outer side walls of furnaces should then be 27 inches thick for boilers 60 inches diameter and larger, 22 inches thick for 48-inch and 54-inch boilers and 17½ inches thick for 44-inch sizes.

Setting plans furnished with boiler outfits.

H-S-G Dutch Oven Furnace Settings



Front View

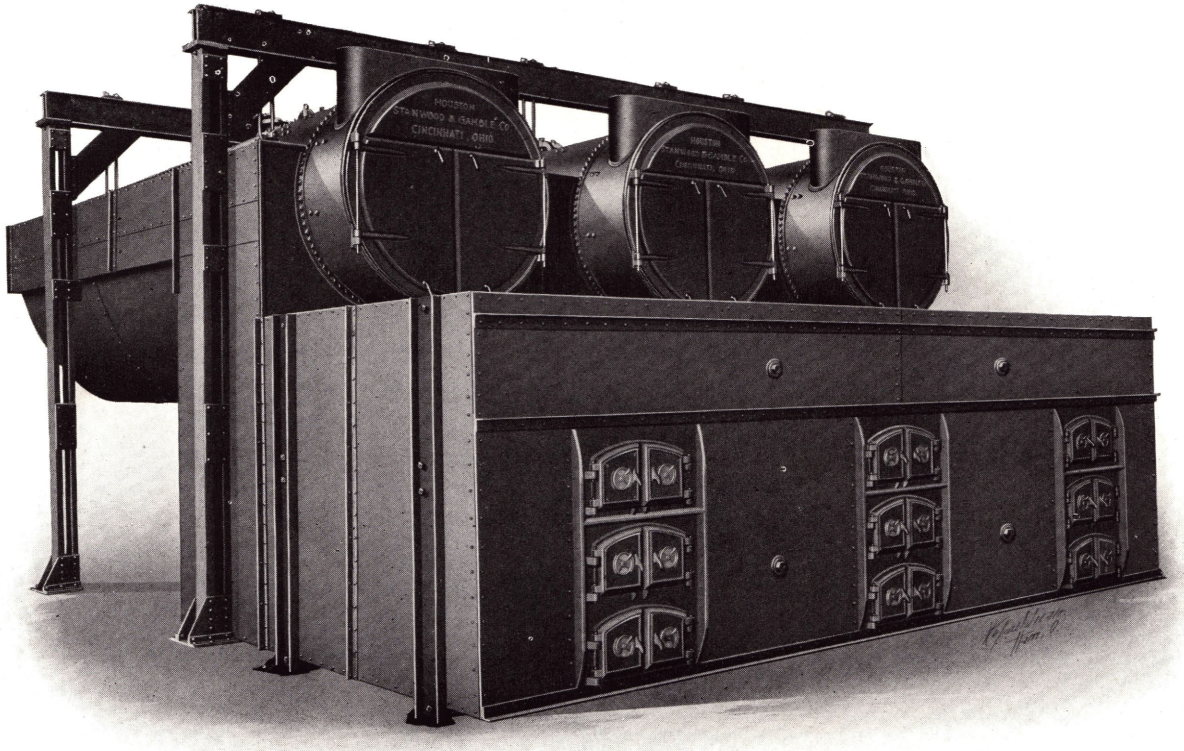


Side View

The Dutch Oven fire front illustrated above (except that fronts for 44″ and 48″ diameter boilers have only one fire door opening) with its anchors, firing pot and lid, horizontal channels to take thrust of arch at the sides of furnace, vertical wall binding bars for sides with their tie rods, and the vertical wall binding bars with long anchor rods for front of furnace, will be included in regular Dutch Oven outfit. The wall binding bars for side, front and rear walls of the boiler setting proper, back of the furnace, also the suspension apparatus or other extras, will only be furnished when specially ordered.

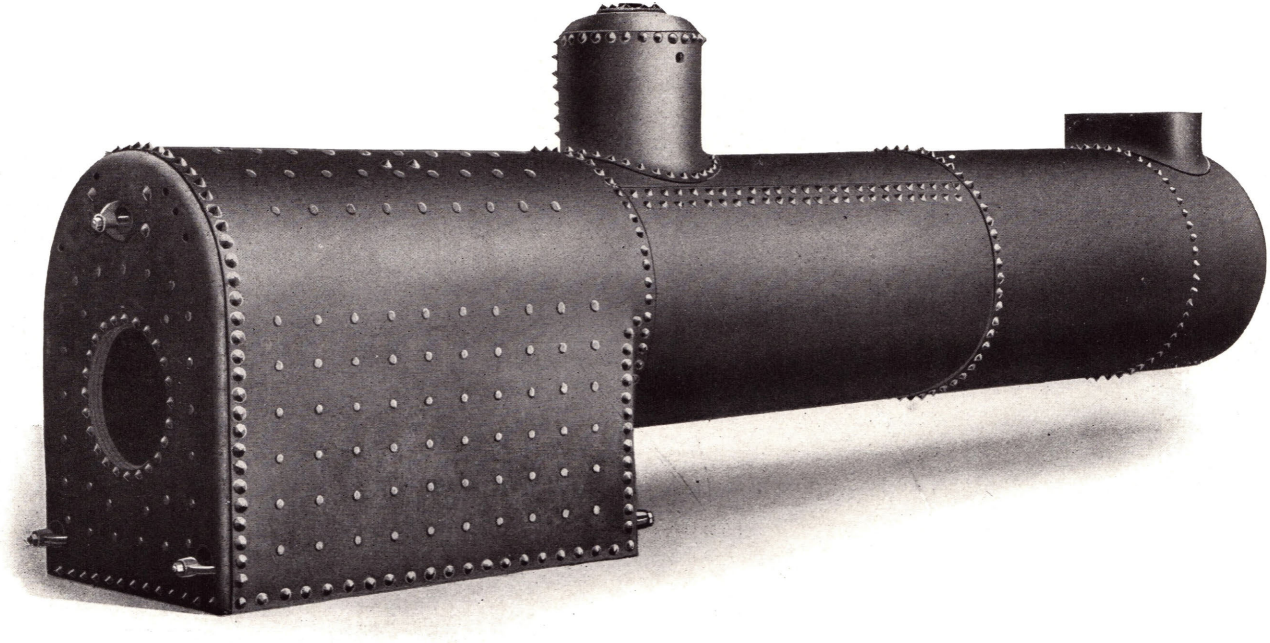
When desired we can furnish, at an extra charge, a self-supporting flat top for Dutch Oven. This special flat top is composed of "I" beams and tiles and eliminates the arches.

Steel Casing Setting



With Dutch Oven Furnace. One or more boilers can be set with this style furnace, as in illustration

When desired we can furnish self supporting flat top composed of "I' beams and tiles, which eliminates arches.



Open Bottom, Water Front

Portable boilers can be mounted on Skids, or on Wheels.

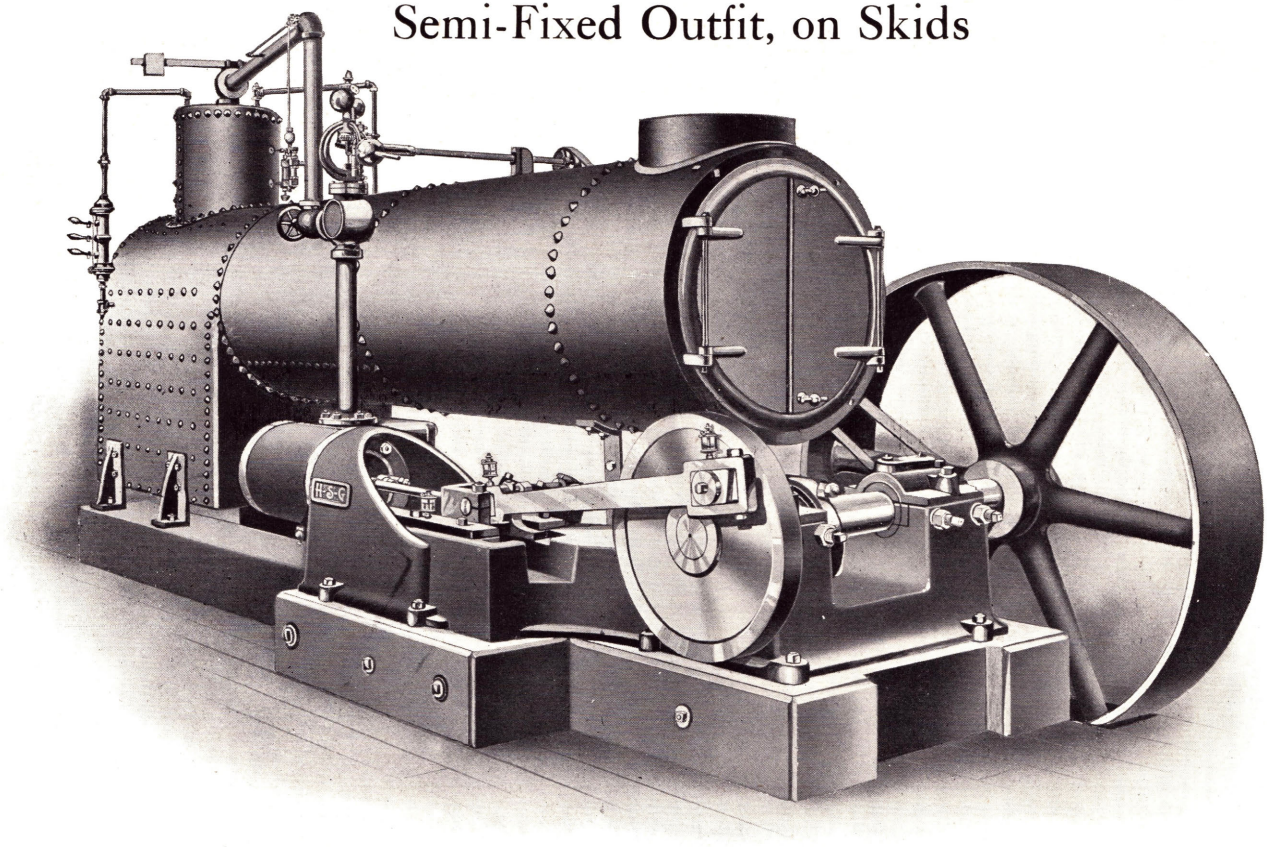
H-S-G TRADE MARK Locomotive Fire Box Portable Boilers. For 100 Pounds. Open Bottom, Water Front

Horse Power		15	20	25	30	35	40	50	60	70	80	100	125
Diameter Shell (Inches)		32	32	36	36	42	42	48	48	54	54	60	62
Length (approximate) of Boiler, Excluding Projection of Doors and Hand-hole Arches (Inches)		137	161	168	192	168	192	198	222	230	254	255	267
Fire Box Size (Inches)	Length	49	49	55	55	55	55	61	61	67	67	67	67
	Height	33	33	38	38	46	46	48	48	52	52	56	58
	Width	26	26	30	30	36	36	42	42	48	48	54	56
Tubes (Diameter all Sizes—3 Inches)	Number	26	26	32	32	43	43	56	56	64	64	82	96
	Length (Inches)	72	96	96	120	96	120	120	144	144	168	168	180
Thickness of Plates (Inches)	Shell	1/4	1/4	1/4	1/4	1/4	1/4	9/32	9/32	5/16	5/16	3/8	3/8
	Fire Box—Outside*	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	3/8	3/8
	Circular Head	3/8	3/8	3/8	3/8	3/8	3/8	7/16	7/16	7/16	7/16	1/2	1/2
Dome—Size (Inches)	Diameter	18	18	18	18	22	22	24	24	28	28	30	30
	Height	18	18	18	18	22	22	24	24	28	28	30	30
Openings and Fittings—Size (Inches)	Steam Outlet	2	2	2	2	2 1/2	2 1/2	3	3	3 1/2	3 1/2	4	5
	Pop Safety Valve	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2	2 1/2	3	3 1/2	4
	Blow-Off and Cock	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	2	2	2	2	2	2
	Side of Dome	1	1	1	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2
	Check Valve and Stop Valve	3/4	3/4	3/4	3/4	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2
	Three 1/2-inch Openings for Gauge Cocks and Two 1/2-inch Openings for Water Gauge in End of Fire Box; 1/4-inch Opening for Steam Gauge in Top of Fire Box.												
Stack	Diameter (Inches)	16	16	18	18	20	20	24	24	26	26	28	32
	Length (Feet)	20	25	25	30	25	30	30	35	35	40	40	40
	Gauge Steel	16	16	16	16	16	16	16	16	16	16	16	16
Weight (Pounds) Estimated	Bare Boiler on Skids	4000	4500	5000	6000	6500	7000	9000	10000	11000	12500	14000	17000
	Boiler Complete	4800	5300	6100	7200	7800	8400	10500	11600	13100	14700	16400	20000

*Inside of Fire Box: Sides and Crown Sheet—5/16; Tube Sheet—3/8, up to 80 H. P. inclusive, and 1/2 for 100 and 125 H. P.; and Door Sheet—3/8.

Boiler complete includes: Bare boiler (with flue doors and fire door) mounted on skids, common grate bars (tupper grates or perforated grates when ordered will be substituted without change of price), steam gauge with syphon and cock, water gauge glass and valves, three ball gauge cocks, pop safety valve, blow-off cock, check valve, globe valve (for boiler feed), stack and guys. An injector, whistle, mounting on wheels, or other additional items are extras, and will only be included when specially ordered and at an extra charge.

Semi-Fixed Outfit, on Skids



Cut shows Class "A" Engine, but Class "D," Center Crank may be used

1910